THE BRICKBUILDER

VOLUME XIX OCTOBER 1910 NUMBER 10

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EDWARD G. GARDEN; PERKINS & HAMILTON; JAMES PURDON; LOUIS SULLIVAN; H. R. WILSON.

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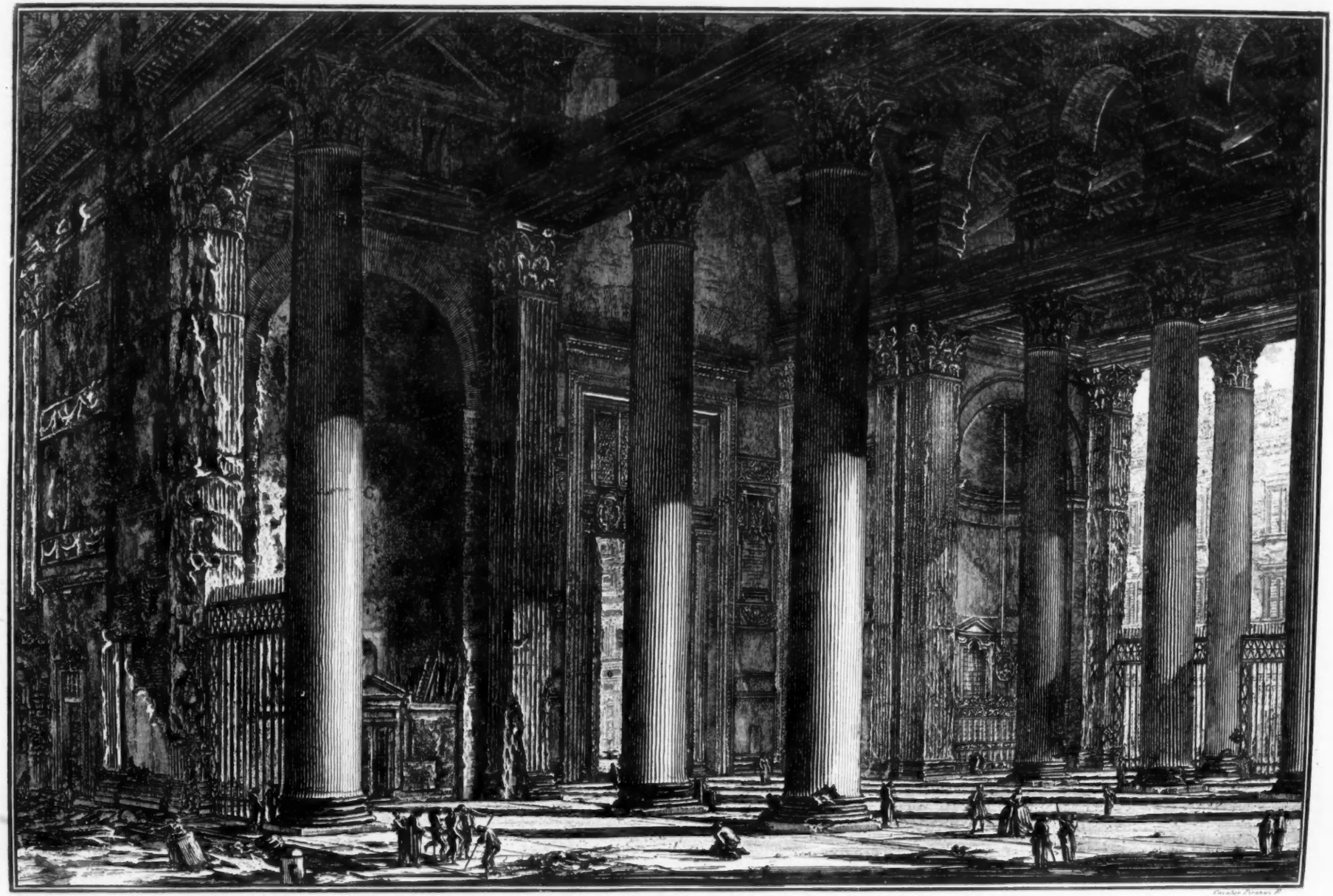


COLUMNS OF THE PORTICO OF THE PANTHEON, ROME.

GIOVANNI BATTISTA PIRANESI, DEL.

The Pantheon, Roman temple of all the gods, the best preserved monument of ancient Rome, dates from the time of the Emperor Hadrian (117-138 A.D.) although the columns of the portico which are here engraved by Piranesi are believed to date from the original building on the site erected by Agrippa (27-25 B.C.). There are sixteen columns of Egyptian granite (46½ feet high, 5 feet in diameter). In the large niches stood colossal statues of Augustus and Agrippa. The only light admitted to the interior comes through a circular opening 24 feet in diameter in the top of the domed ceiling. The walls are 20 feet thick, faced with brick 1½ inches thick, laid in mortar ½ inch thick. The building became a Christian church in 608. It contains the tomb of Raphael.

THE BRICKBUILDER

VOL. XIX. NO. 10. OCTOBER, 1910.

Hints on Architectural Acoustics.

BY HUGH TALLANT.

PART II. (CONTINUED).

COMPUTATION AND PRACTICE.

AS ENUMERATED in the September number of THE BRICKBUILDER, the principal acoustic defects are *insufficient or excessive loudness; indistinctness due to interrupted reverberation; indistinctness due to sound-interference; echo;* and *insufficient or excessive reverberation.* It has already been shown that the first three defects result mainly from conditions at the *front* of the auditorium, and may be remedied by arranging the side walls and ceiling in the form of a scientifically-shaped megaphone. The fourth defect, indistinctness due to sound-interference, results mainly from conditions at the *back* of the auditorium, and may be remedied by preventing the rear wall from deflecting sound into the audience. The obvious means of accomplishing this result is to cover the rear wall with sound-absorbing material. All textile fabrics are good absorbents, but the best results are obtained from hair-felt set out a couple of inches from the wall. The absorbing capacity is lessened if the felt is placed closer to the surface behind it. Unfortunately the decorative effect of this material leaves much to be desired, and considerable ingenuity is often required to disguise its unsightly appearance. In one well-known case a fine mesh has been stretched above the felting, and marked off in imitation stone-joints. The effect is said to give satisfaction, although scarcely a sincere expression of the means employed. However, there seems no valid objection to covering the felt with some one of the burlaps, tapestries, brocades or other textile wall coverings which have recently come into such extensive use. The absorbing capacity thus obtained is over eighty per cent, or amply sufficient for all practical purposes. The material may be either tacked on battens secured at proper intervals to the wall, or it may be stretched on loose frames and disposed in the form of panels in a strip wainscot. In the latter case if the alternate stiles are made movable, as suggested in Fig. 24, the panels can be removed for cleaning — often a consideration of some moment.

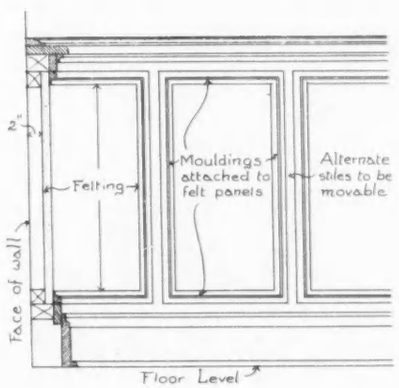


FIG. XXIV.

As a rule, however, the covering of large wall surfaces in the manner described is inconvenient as well as expensive, and other expedients for preventing sound-interference are to be preferred. It is well to begin by reducing the exposed area of the rear wall to a minimum. This may be accomplished by stepping up the floor toward the back of the auditorium as shown in Fig. 25, a procedure which is

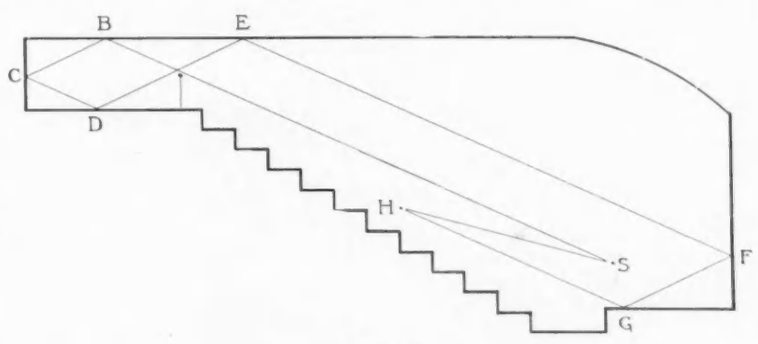


FIG. XXV.

of benefit to the sight lines as well as to the acoustics. In this connection it may be noted that the better an audience can see the speaker the better they will hear him. An uninterrupted line of sight presupposes an equally clear path for the direct sound, and anything that promotes the former will subserve the latter. For instance, the so-called *isacoustic curve* obtained by increasing the heights of the steppings as they recede from the speaker, is of distinct acoustic as well as visual advantage, because it raises the occupants of the rear seats clear of the sound-shadows cast by those in front. The curve is difficult to realize in a balcony, but may almost always be obtained on the main floor. The precise curvature which gives the best results is of somewhat complicated design, but a close approximation may be obtained by increasing the heights of the risers in arithmetical progression. Where the speaker's platform rises some 3 feet above the adjacent floor the first stepping should be about 2 inches high. If the platform is lower the front riser should be higher. The successive heights of the following risers may be determined by making the common difference such as to bring the top stepping to the desired height. The curve thus obtained is a little too flat, but will serve the purpose in ordinary cases.

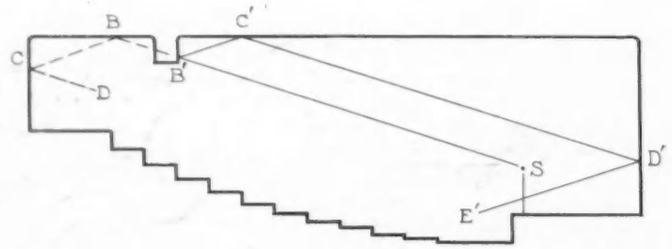


FIG. XXVI.

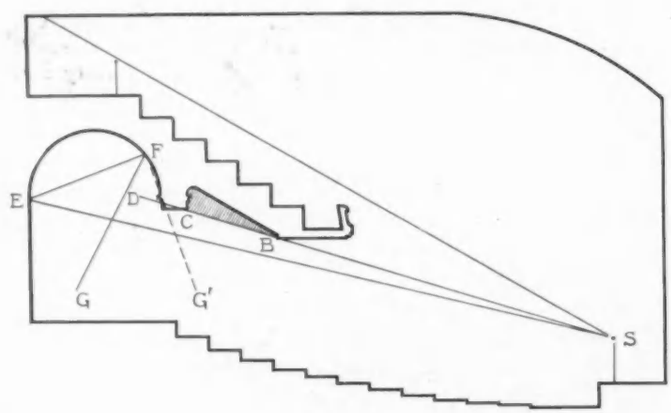


FIG. XXVII.

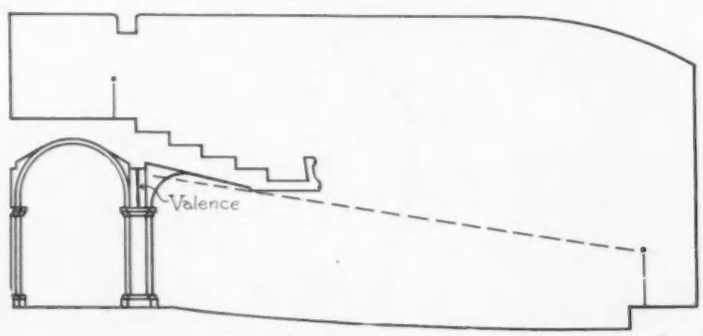


FIG. XXVIII.

If possible, the floor at the rear of the auditorium should be so high that the first sound SB, Fig. 25, which escapes above the shoulders of the audience, will strike the ceiling before it can reach the rear wall. This will cause every sound which strikes the rear wall to be deflected to the floor (or possibly to the backs of the last row of seats) before it can reach the ears of the audience. If the floor is carpeted the sound will be largely destroyed by the impact, but in any case what is left of it will take such a path as DEFGH, and, when it finally does reach the audience, will be moving almost parallel to the direct sound, which it will tend to reinforce rather than to counteract. At the same time, in a megaphone-shaped auditorium this deflected sound may easily reach the audience at H so long after all other parts of the same sound-wave as to threaten an echo. For this reason it is wise to cover the floor behind the last row of seats with extra heavy carpeting so as to absorb as much of this dangerous sound as possible.

This expedient is often effective at the rear of a balcony, but, as will be seen from Fig. 25, it involves a height of steppings which is excessive for the main floor. Where this proves to be the case, the same result may sometimes be attained by the introduction of a false beam, as shown in Fig. 26. A sound which would otherwise cause interference by moving in the path SBCD will be intercepted by the beam at B′ and deflected into the audience in the direction D′E′. This procedure is, of course, open to the same objection as the preceding one, and must be carefully checked for echo in the case of a megaphone-shaped auditorium.

Under the soffit of a balcony the conditions are more tractable, and a false beam may often be inserted with impunity as well as advantage. This is owing to the fact that the overhang of the balcony intercepts the direct

sound in such a way as to cast a broad band of sound-shadow, as indicated in Fig. 27, while at the same time the audience below absorb all the deflected sound. Under these conditions no sound can reach the front face of the beam so long as it is kept within the limits of the shadow, and there can be no danger of echo if the corner C does not protrude below the contour SBD of the shadow.* By carrying up the ceiling behind the beam in the form of a high barrel-vault, as indicated on the diagram, practically all the sound that escapes above the shoulders of the audience may be harmlessly deflected to the carpet by some such path as DEFG, instead of causing serious interference at G'.

FIG. XXIX.

Where the slope of the balcony is slight, as shown in Fig. 28, the above expedient cannot be employed because the overhang does not cast a sufficient shadow. In this case the barrel vault should be replaced by a groined vault carried on arcades. The arches above the impost can then be filled with a heavy valence which will absorb the sound which strikes it from either side. What little sound passes between the audience and the lower edge of the valence will be immediately dissipated under the vaulting beyond. Fig. 29 gives a general view of the construction employed for this purpose in the New Amsterdam Theatre, while Fig. 30 shows a single arcade and valence. In this case a series of irregular domes on pendentives was employed instead of a groined vault. A simpler means of obtaining the same result is shown in Fig. 31. This last arrangement has the advantage of utilizing such sounds as SBA to reinforce the direct sound SA at the very point where reinforcement is most needed. It is convenient and presents a simple decorative effect where the balcony has only a slight projection, but it cuts down the headroom at C to a disagreeable extent if the overhang is large.

All of the above methods of preventing sound-interference may often be required in a single case. Fig. 32 is taken from the preliminary layout for a theater where the first expedient is being employed on the upper balcony, the second on the lower balcony, and the last on the main floor. The reader's ingenuity will doubtless suggest other architectural devices for accomplishing the same result.

FIG. XXX.

The fifth defect, *echo*, is really an exaggerated case of interrupted reverberation, being merely the return to the audience of a certain sound or group of sounds after the rest of the reverberation has very largely died away.

This may be simply illustrated by the example of an ordinary corridor. The listener at A, Fig. 33, hears at first a succession of sounds beginning with the direct sound and followed by others deflected one or more times from the side walls XY and ZW. These sounds grow rapidly fainter, partly because of the increasing length of their paths, and partly because of the additional number of impacts against the side walls. Suddenly, however, there arrives a great accession of tone caused by the

*Theoretically the direct sound has a slight tendency to spread sideways into the space above the line SBD. It is well known that on the exact contour of a shadow the sound still retains a quarter of its intensity. This fact is of no practical importance in this connection.

return of the sounds deflected from the end wall, WX; and the shock is accentuated by the fact that the newcomers have been deflected a relatively small number of times, and therefore have been comparatively little weakened by impact and absorption. Of course if the corridor is less than 40 feet long the sounds from the further end will return before a perceptible interval has elapsed, but otherwise the result will be a loud and prolonged echo.

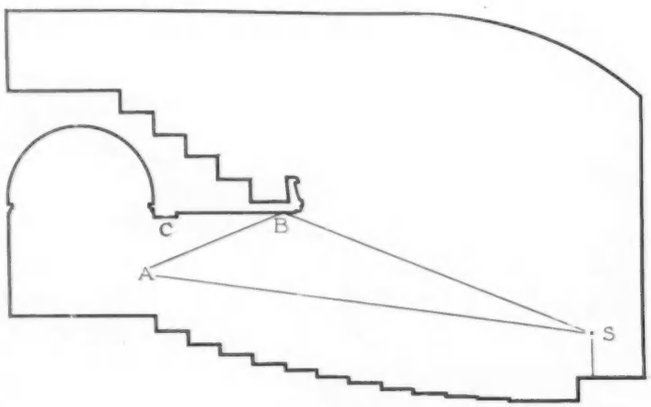


FIG. XXXI.

As, however, all the sounds causing the echo must strike the end wall before returning to the listener at A, they can all be destroyed and the echo prevented by applying an absorbent to the end wall. In this case the effect will be that of a single sound accompanied by a rapidly fading reverberation. On the other hand, if the absorbent be applied to the side walls and not to the end, it will permit only two sounds to reach the hearer, namely, the direct sound traveling in the path SA and the deflected sound traveling in the path SBA. In this case the effect will be that of an initial sound and a sharp distinct echo without accompanying reverberation. It therefore appears that the position of the absorbent is of prime importance and that totally different effects may be produced in the same building by an alteration in the position of the absorbents with relation to the speaker.

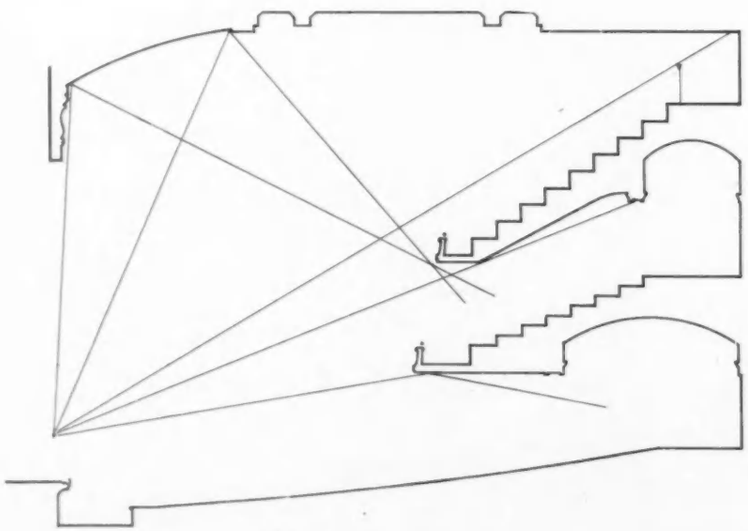


FIG. XXXII.

The example just quoted is typical of the general conditions which produce echo in an enclosed space. The same train of reasoning may readily be applied to other similar cases. For instance, a semi-detached room at a distance of 40 feet or more from the hearer may develop an echo if the reverberation lasts longer in the room than in the hall. The difficulty can be readily overcome by increasing the absorbing-capacity of the room.

The conditions under which echo is produced by a dome have already been fully discussed. Where, for decorative reasons, the dome cannot be flattened to such an extent that echo is impossible,* the only alternative is to cover its entire surface with felting. Apparently under favorable conditions the central portion BD, Fig. 34, might be left unprotected and used with advantage as a deflecting surface, but the writer is acquainted with no precedent for such a treatment. Dangling wires or a fine silken mesh suspended at the base of the dome are sometimes used as absorbents, but their effect is only palliative.

The last defect, *insufficient* or *excessive reverberation*, is best treated by avoiding reverberation and depending as far as possible upon resonance for proper quality of tone. All reverberation tends toward confusion. In moderation it undoubtedly adds quality of tone, but an even better quality without the corresponding indistinctness can be obtained by means of resonance. This fact seems to have been known to the ancients and to have been considered in the construction of their auditoriums. One of the best restorations of a classic theater† is reproduced in Fig. 35. As will be seen, the speaker was placed so far below the top row of seats that all sounds which did not strike the audience rose at once into the open sky. In fact, such an auditorium is the perfection of the megaphone principle, the sloping sides of the amphitheater corresponding to the

* See THE BRICKBUILDER for August, 1910, page 178, Fig. 10.

† *The Theater of Ostia* from the drawing by Pierre André, as published by D'Espouy.

megaphone surface, while the heavens above furnish a perfect sound absorbent. No continuous deflection is possible under such conditions, and the complete absence of reverberation results in that marvelous distinctness and carrying power so often remarked, not only in ancient structures but also in modern amphitheaters, such as the Harvard Stadium* and the open-air theater at Berkeley.

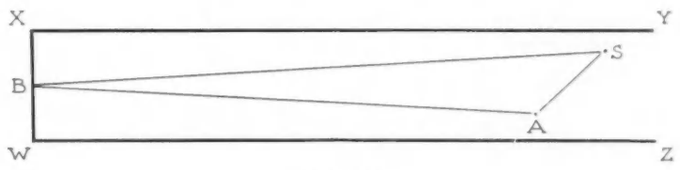


FIG. XXXIII.

At the same time this arrangement possesses the defects of its qualities, as the lack of reverberation naturally involves a distressing poverty of timbre. The Greeks, with their delicate sensibilities, did not fail to perceive this blemish, and had recourse to a surprisingly ingenious and scientific remedy. Their method was to distribute at regular intervals throughout their auditoriums what the modern textbooks would call resonators. "These are hollow vessels whose air cavity has been carefully tuned to a definite pitch, and the air in which, therefore, is readily thrown into vibration by a note of the same period. The older resonators were spherical, but the later ones are cylindrical in form. If the sound to which the resonator is tuned exists in the air in the vicinity, it will be reinforced and become audible."† The ancient resonators consisted of vases, generally bronze but sometimes earthenware, which were disposed in niches hollowed out between the theater seats. These niches are still in evidence at Taormina, where they are contrived in the dwarf wall on which the columns of the upper gallery stood.‡ The vases were set with the orifice downward, like a bell, and were carefully wedged up so that their vibration might not be checked by contact with the masonry. The Greeks were well aware of the principles of sympathetic resonance, and knew that a resonator would respond only to tones of the precise pitch with which it was in unison. They were, accordingly, at extreme pains to attune their vases with mathematical precision so that there would be vases to respond to tones of every pitch, and also to arrange the vases in regular order so that those which corresponded to any particular pitch might be evenly distributed. In a small theater there was usually only one row of these vases, placed half way up the incline of the seats, but in more important structures there were sometimes as many as three rows, dividing the auditorium into four equal parts, and the size of the vases was further proportioned to the size of the house. In this way the lack of reverberation was offset by a proper amount of resonance evenly dispersed among the audience, and requisite quality was given to the musical tones.

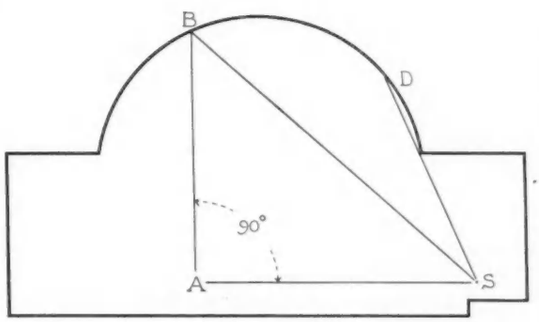


FIG. XXXIV.

The foregoing description is, of course, transcribed from the well-known account of Vitruvius (V. 5), which also contains an introductory chapter on the principles of musical harmony according to which the vases were attuned. Unfortunately there is no mention of any precise method for computing the number and size of the resonators, so that we do not know whether the Greeks had established any mathematical relation between the dimensions of an auditorium and the quantity of resonance required. Moreover the Greeks were ignorant of the third as a musical consonance,§ and consequently their method of tuning would probably be imperfectly adapted to a musical system based, like our own, on the major and minor triads. Nevertheless the example of the classic theater is of extreme interest and value, as indicating that the ancients had arrived at a perfect solution of their own acoustic problem by depending wholly upon resonance for quality of tone.

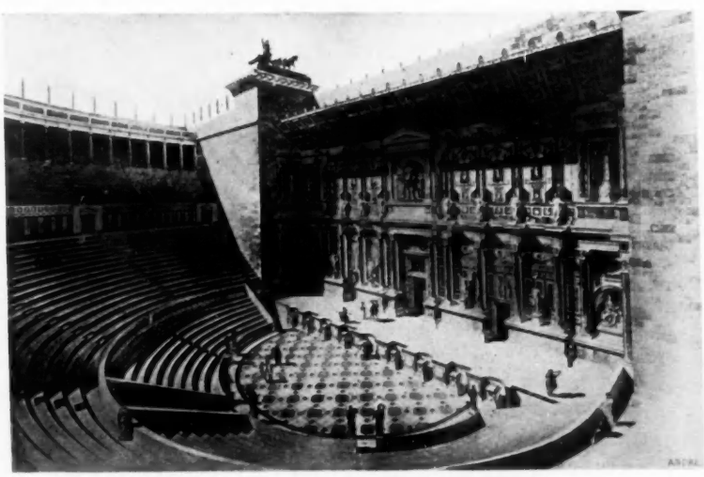


FIG. XXXV.

*This fact was amusingly demonstrated at the opening of a recent Harvard-Yale football match. At the very moment of putting the ball in play — when every voice was hushed in the tense excitement — someone high upon the bleachers saw fit to unbosom himself of the trite remark, "Oh, cut it out!" Instantly a ripple of laughter spread throughout the entire stadium, showing that the admonition, although expressed in an ordinary tone of voice, had been simultaneously understood by 20,000 spectators.

†Barker, Physics, pages 250, 251.

‡See the *Encyclopædia Britannica*, Vol. XXIII., pp. 222 and 223.

§See *What is Music* by Isaac L. Rice, Chapter VI., page 14.

Inexpensive English Houses which Offer Suggestions.

BY HENRY A. FROST.

OF ALL the problems given an architect to solve few are capable of such a wide range of expression or possess greater possibilities of treatment than the small house. While affording him much trouble and little profit, it is at the same time a problem which exerts upon the community, and upon the country at large, an important influence. As a beautiful church or an imposing public building raises the tone of a city square, so it remains for the houses of the people to make upon a visitor the lasting impression that will cause him to look back upon the city as a desirable place in which to live. Any problem vitally affecting life, and the mode of living, assumes greater importance to the mind than does the contemplation and enjoyment of a purely extraneous work of art.

The problem of the well designed house, therefore, is one of first importance. In the congested districts, where many families must live within very limited areas, where every foot gained is money saved, and where numberless city ordinances are imposed, the housing problem becomes very complex. Little wonder then if the results tend to show a surprising uniformity and lack of interesting features. In such problems whatever genius the architect may have had, is too often swamped in a sea of requirements. But in the suburbs and in the smaller towns, where more space can be had, even though the lot be limited, the opportunity for individuality is great. Within recent years individuality has meant simply difference, for it has not been realized that a house might possess such a quality and still not be strikingly at odds with its neighbors. On the other hand it has been felt necessary to make the house entirely different from those surrounding it. But individuality not accompanied by a strong sense of fitness becomes mere eccentricity.

The truly successful house, to possess individuality, must harmonize its surroundings, not subordinate them. That there are at present so many houses possessing this desirable quality is due largely to the fact that the fascination which the problem has for the architect causes him to labor far beyond the point where it may be counted profitable. In return for his sacrifice is the satisfaction of knowing that one spot in an otherwise uninteresting neighborhood has been made attractive, that another step has been taken toward the beautification of the American town. It is beginning to be understood that the beauty of the New England colonial village was gained by the very means which later were so conscientiously shunned — truth of expression.

It is but natural to turn for suggestion in this matter to the country from which the American colonists drew their inspiration, and where the expression of the home has always been beautiful. The same straightforward simplicity of the English house, which influenced the colonial builders so profoundly in all their work, excites our admiration now. In the success of these houses the use of local materials, often employed for reasons of economy rather than from an appreciation of their beauty, plays an important part. For the same reason, in New England, with the increasing scarcity of wood, brick, as a local material, easily obtainable, seems to be a happy choice.

A small house, generally speaking, presupposes a moderate income. While this by no means necessitates cheapness of construction it naturally suggests simplicity and a straightforward use of materials. These very limitations are often its salvation, and make the small house in many instances far more successful than its more pretentious neighbors, where wealth finds an outlet in over-elaboration.

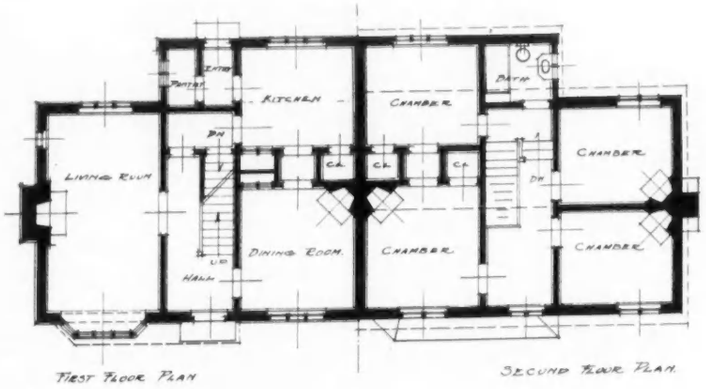
Of the houses here shown, three are single, and three are double. They all have brick as the basis of construction. In some it is allowed to show only as high as the first story window sills, in others it shows to the level of the second floor, and in one example the exterior walls are entirely covered with stucco. In England many single and double houses such as these are built for investment, and again, as in this country, by men of limited means, who desire to own a home, but hesitating to tie up so much capital, find a way to compromise by renting one-half of their house in order to pay interest on their investment, while their own rent consists of taxes and repairs.

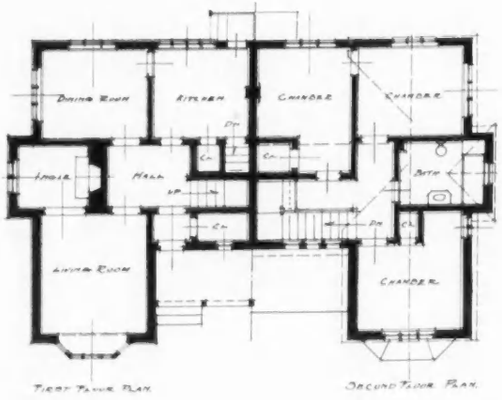
The houses, it will be seen, are of extreme simplicity, and would appear bare were it not for generous planting. Given a good wall surface and a few well spaced, well proportioned openings, an interesting roof, and in the less expensive work, few dormers — often a fortunate omission — and an Englishman is content to overcome any suggestion of baldness with shrubbery, hedges and climbing vines. As a result one is struck first, not so much by any intrinsic beauty of the house alone, as by its perfect fitness to its surroundings. For the house is made to fit the surroundings, and they in turn are improved, to set off the house.

Sketch plans of the houses are shown. They have been changed somewhat with an idea of suggesting how easily the work is adaptable to American needs. Such changes are chiefly in the service portion of the house, where the requirements of the English differ from those of Americans. The double house near Horsham, with the brick lower story, the plaster and half timber work above, and the roof of heavy slates, recalls in its plan the old colonial houses, particularly some of those still found in Connecticut. The hall, running through the center, opens on the one side into the living room, on the other, into dining room and kitchen.

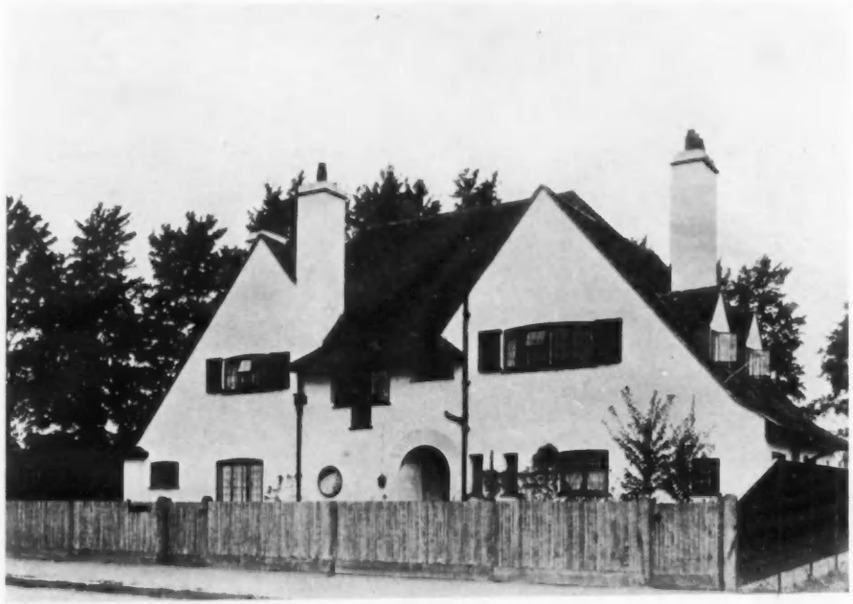
In the actual house it is quite possible that the living room does not run the full depth, for English houses of this general type seem, as a rule, to prefer two small rooms instead of one large one. Perhaps this is due to inefficient methods of heating during the cold seasons. In an English house of this size, also, it is not unusual to reserve one end of the living room for a dining alcove, or if there is a separate dining room, to place the kitchen across the main hall from it. A bathroom and either a maid's room or a sewing room are provided on the second floor plan as opening off the stair landing three steps

MODERN TWO FAMILY HOUSE AT HORSHAM, SUSSEX.

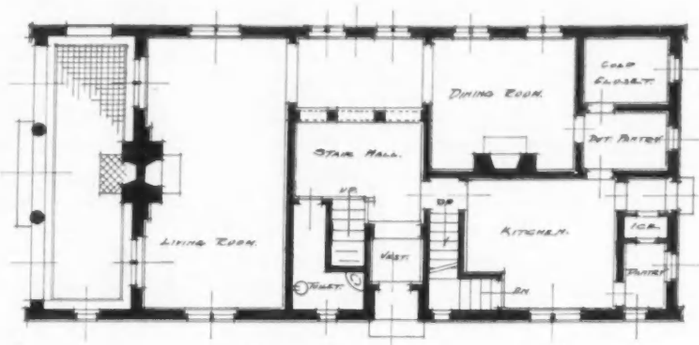




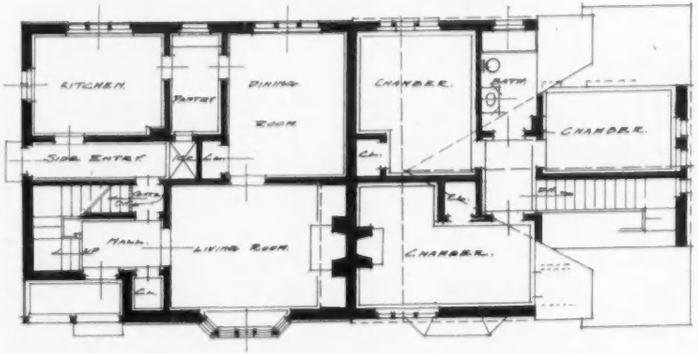
MODERN TWO FAMILY HOUSE, CUCKFIELD, SUSSEX.



MODERN HOUSE AT WOKING, SURREY.



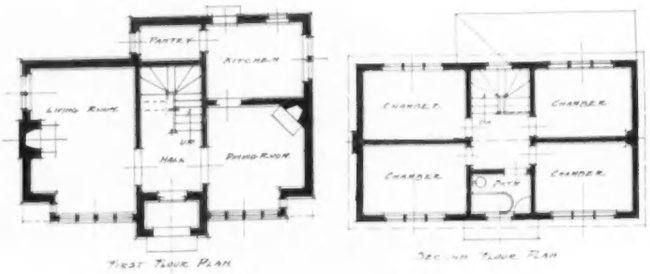
FIRST FLOOR PLAN.



FIRST FLOOR PLAN.

SECOND FLOOR PLAN.

MODERN TWO FAMILY HOUSE, CUCKFIELD, SUSSEX.



MODERN COTTAGE, NEAR WOKING, SURREY.

MODERN COTTAGE,

DYMCHURCH,

KENT.

below the main second floor. This may be regarded as a makeshift, though it is an arrangement with some advantages.

In the smaller English houses, specially such as are found in the country, bathrooms are not usually under the main roof, and cellars are almost unknown. The attempt to provide these conveniences as in the Horsham house causes at times more or less departure from the original plans. The attic in this house is of use only for storage and ventilation. Such houses, with almost no breaks and a straight roof over all, with the simplest arrangement of rooms, are, of course, the least expensive to build, both from point of view of first cost and maintenance.

In the two houses at Cuckfield perhaps a more charming effect is obtained by a simple use of gables. In none has the mistake been made of trying to hide the fact that they are double. On the other hand, the truth has been emphasized, and the line of division is strongly marked, in one by a heavy chimney and conductor, in another by a leader from the divided gable, and in the third in a more subtle way, the line of division being felt rather than distinctly expressed.

The double house at Cuckfield, with its two projecting bays, offers rather an economical and convenient plan. In order to give a comfortable ingle, a bathroom resulted above, which is full ample for a house of this size. The extra space is not a matter of particular importance, as the three bedrooms are as many as could be accommodated on the floor. An attempt to add a fourth would result in cutting them all down to a size which would be very cramped.

If the kitchen and dining rooms were changed about all flues could be carried in one stack, thus effecting some saving. But the dining room would be darker and less attractive.

The second Cuckfield house works out well. Perhaps its greatest objection is that the dining room has to be approached through the living room, except, of course, for the service door through the pantry.

The chimneys deserve mention. In the three houses they differ radically, but in each the effect is gained by the simplest use of brick, tiles and chimney pots. The gates and the hedges around the two Cuckfield houses add much to the general appearance, and instead of giving the effect of cramping the houses, both of which are on small lots, the effect gained is one of greater spaciousness coupled with privacy.

Of the three single houses the one at Dymchurch, with its brick, stucco and half timber, is typical of the English shore cottage. That the charm of these cottages is much enhanced by their surroundings is strikingly evident here, where an otherwise attractive house loses much from lack of trees and planting. The contrast of timbers blackened by exposure, with plaster dead white, needs to be softened by generous foliage. The plan is similar in general arrangement to that of the double house at Horsham. The rooms, however, are smaller, and closet space is at a premium, as must be the case when a cottage of seven rooms occupies considerably less than 700 square feet. The disposition of chimneys permits fireplaces in nearly every room.

The two houses at Woking depend for their effect upon good lines, a charming grouping of windows and plain wall surfaces. The plans as shown, with their slight adaptations, are but little changed from the original. The larger house is perhaps a trifle pretentious for the rest of the houses treated in this article. The separate service stairway, maid's room, and the large living porch all mark it for a more expensive house. It cannot, however, be considered extravagant. It merely contains the elements of the other houses carried a little farther.

The smaller of the Woking houses, on the other hand, may well be considered in proportion to its size the most expensive of the six. It approaches the extravagant, with its generous use of gables and dormers. It is also, perhaps, the most picturesque.

The chimneys again are worthy of study. Many houses, otherwise uninteresting, have been saved from stupidity by their judicious use, while others of much excellence have suffered from their haphazard, unstudied positions. In English work such a failing is rarely encountered.

Examples such as these could be produced without number, all showing the same beauty of treatment, the same harmony of the parts with the whole, and the whole with its surroundings, which makes England deserve the name of the country of beautiful homes.

Burnt Clay's Share in the Rebuilding of San Francisco.

I. Commercial Buildings.

BY WILLIAM C. HAYS.

THE kernel of it all here in San Francisco is that the optimist made good. It was on the second day of the great fire: those not busy in moving household or office effects to safe places were gathered in groups, watching. We stood on Nob Hill during the destruction of the Hopkins' Institute of Art, and the gutting of the nearly completed Fairmont Hotel. Below, the south slope, out Sutter and Bush streets, was a seething hell; south and eastward was ruin. Even then, in the hour of destruction, he was there, the "Coast" type, the practical optimist. Shaking both fists at the flames, he declaimed: "I tell you, San Francisco will rise from these ruins like a Phœnix"—and the man next him, a scoffer, echoed, "Nix!"

But in two days, the mayor, a practical—if impetuous—optimist sent telegrams to city executives everywhere: "Send us architects; not food nor clothes—architects." Then another loyal son and seer paraphrased Kipling and published:—

THE DAMNDEST FINEST RUINS.*

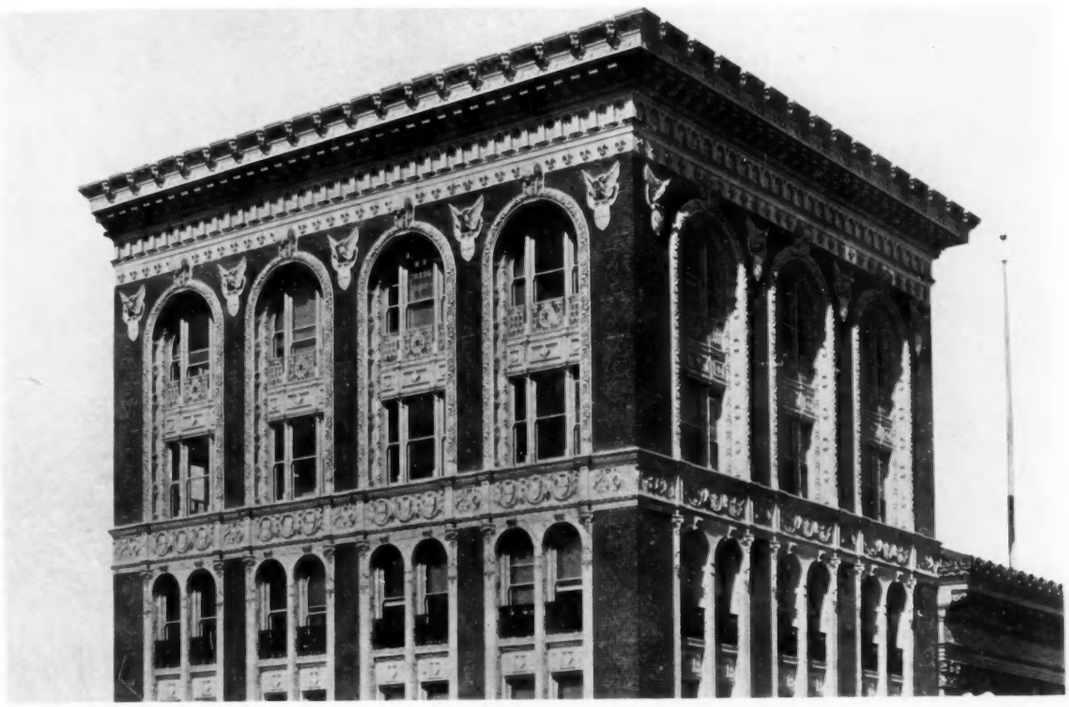
Put me somewhere west of East Street where there's nothin' left but dust,
Where the lads are all a-bustlin' and where everything's gone bust,
Where the buildin's that are standin' sort of blink and blindly stare
At the damndest finest ruins ever gazed on anywhere.

Bully ruins — bricks and wall — through the night I've heard you call,
Sort of sorry for each other 'cause you had to burn and fall,
From the Ferries to Van Ness you're a God-forsaken mess,
But the damndest finest ruins — nothin' more or nothin' less.

The strangers who come rubberin' and a-huntin' souvenirs,
The fools they try to tell us it will take a million years
Before we can get started, so why don't we come to live
And build our homes and factories upon land they've got to give.

"Got to give!" Why, on my soul, I would rather bore a hole
And live right in the ashes than even move to Oakland's mole,
If they'd all give me my pick of their buildin's proud and slick
In the damndest finest ruins still I'd rather be a brick!

* Copyright, 1906, Lawrence W. Harris.



DETAIL OF UPPER STORIES, THE NEWHALL BUILDING.
Lewis P. Hobart, Architect.

DETAIL FROM NEWHALL BUILDING.

Yes! it was the practical optimist who wrought the miracle of reconstruction: he started the wave of enthusiasm; he compiled figures to show that the earthquake wasn't really so destructive, and that fires have occurred elsewhere. Scarcely waiting to collect his insurance, the optimist backed up his confidence. He rented temporary quarters and wired orders everywhere for big stocks of new — and the best — goods. Then he sought outside capitalists who believed in the stability of San Francisco's business to outweigh the instability of soil in an earthquake zone. So again the city arose, almost, it seems in looking backward, over night, which four years ago lay leveled. To-day it has more and better stores, banks, office buildings and great hotels than ever in its history.

Merely to take a cursory look over the reconstruction means traversing miles of streets, and then some of the best among the smaller buildings are apt to be missed, since there are many good things tucked away in hidden corners. Over an area of several square miles the change is complete but for topography and here and there a familiar feature that has been restored.

Architecturally and structurally, it is true, the average new building is far better than the average old one which it replaces. But nevertheless one feels in the new streets an intangible loss; it is the colorful quality of the

old town that, inevitably though unfortunately, is no more. Happily in the midst of their *nouveaux* neighbors still stand Page Brown's fine Crocker Building, the low Montgomery Block and its surrounding buildings, the old Parrott Building — of granite brought ready-hewn from China way back in the early days — the Mills Building and the Mint; all these unchanged, dignified, aloof. Many other "before-the-fire" buildings are restored too, but they are mostly of more recent date than these.

DETAIL OF UPPER STORIES, THE ALASKA COMMERCIAL BUILDING.
Meyers & Ward, Architects.

At costs varying greatly these landmarks have been saved of the city that was, although much stone facing was badly spalled by the heat and some terra cotta was shaken and sheared. I am told, by the way, that a total outlay of only $2,000 restored all terra cotta on the Crocker, Union Trust, and Hale Brothers Department Store buildings, though these are all tall structures and were exposed to the severest of earthquake and fire, in the great test.

It is worth while to note the immensely important part played by bricks, terra cotta and tiles in the construction of the entirely new buildings, as well as in restoration of the old. As to internal structure, the local manufacturers of clay products do not push the making of floor and partition blocks, the plants generally being run to their full capacity in making exterior terra cotta, so that this great field has in most cases been left uncontested to other structural materials. However, the partitions and floors in some of the principal new hotels, stores and office buildings are of hollow blocks — always, of course, tied carefully with clips, for security against vibration.

DETAIL FROM NEWHALL BUILDING.

The former business section was a city of cast-iron frontage: the new shows block after block of brick and terra cotta, contrasted here and there with equally interesting and imposing structures of cut stone. In the shopping districts the lower stories are frankly show windows, and of such size as to remind one of the old Elizabethan rhyme anent a great house in Derbyshire:

> "Hardwick Hall
> More glass than wall,"

and to suggest the paraphrase:

> "Windows tall
> All glass, no wall."

Among these brick, terra cotta and tile buildings there is a broad variety in composition: some are clever counterfeits of cut stone, as to form, finish and color; a few are orgies of exaggeration in the plastic quality of clay; many are sane

METROPOLITAN LIFE INSURANCE BUILDING.
N. Le Brun & Sons, Architects.

and appropriate; a few are beautiful. They vary in color from the simple match of terra cotta and brick, ranging through grays, buffs and reds, to the sprightliness of old decorated majolica. There are examples of standard surface, matt glass and lustrous enamel. Some of the ornament has been modeled charmingly by the hands of artists, though much of it is crude and ill studied — in mitigation of which it may be argued that the earliest buildings were rushed through by owners who would not allow their sometimes well-meaning architects time for proper study — which undoubtedly was true.

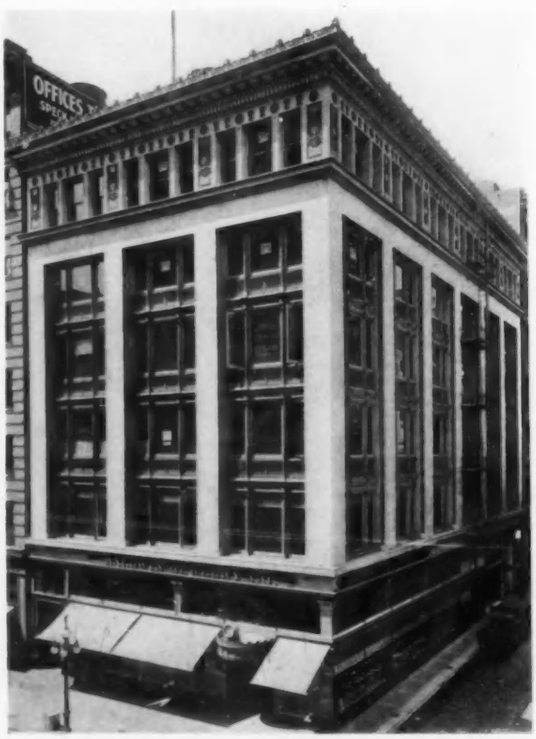
THE "WHITE HOUSE."
Albert Pissis, Architect.

Probably the first important work chronologically in the business district was the Sherman Clay building, eight stories high, of steel frame — of course for earthquake resistance, as are all the best new things — and of cream-colored matt glaze terra cotta exterior. This building was a pioneer in the complete elimination of apparent means of support through the lower story, the columns all being back behind the continuous area of plate glass. It is entirely occupied by a piano and music house, and the owners have been followed by their three strongest competitors, who likewise have all provided themselves with handsome quarters and shown their preferences for matt glazed terra cotta façades.

The department stores moved back into the down-town district almost simultaneously, nearly all occupying imposing new structures, second to but few in the country — almost all of them being, like the piano dealers', lustrous

THE GUNST BUILDING.
Lansburg & Joseph, Architects.

THE ROYAL INSURANCE BUILDING.
Howells & Stokes, Architects.



THE BALDWIN JEWELRY CO. BUILDING.
Bliss & Faville, Architects.

THE SECURITY BUILDING.
Howard & Galloway, Architects.

THE ALASKA COMMERCIAL BUILDING.
Meyers & Ward, Architects.

THE NEWHALL BUILDING.
Lewis P. Hobart, Architect.

THE SHERMAN CLAY BUILDING.
L. B. Dutton, Architect.

THE BALBOA BUILDING.
Bliss & Faville, Architects.

enamel or matt glaze terra cotta. In the "White House" designed by Albert Pissis there has been used structural as well as ornamental terra cotta throughout, and it is a plant of the highest class.

When W. & J. Sloane announced plans for an eight story building to cover a big lot on Sutter street, they too started a series of matt and enamel terra cotta or brick buildings, for most of the other furniture and carpet houses promptly followed suit and put their inflammable stocks within terra cotta and brick walls.

It is not surprising, then, to find solid blocks of terra cotta buildings, for the instances mentioned are not exceptional, but typical of the retail shopping streets. In connection with several of them color has been introduced with varying degrees of success.

The Royal Insurance Company commissioned Howells & Stokes to do a tall building for them and, bless them, sent the only Sayre & Fisher bricks out here to remind us quondam easteners of home. This building, however, has already been published, and so is not given the space here which its importance would warrant. It is not a little reminiscent of the Company's New York building on William street. In that immediate neighborhood, too, is another echo of lower New York in Meyers & Ward's building for the rich and influential Alaska Commercial Company. The plentiful use of ornament forms symbolic of the Company's connection with the Alaskan and Behring waters is a commendable departure: one is accustomed to the cables, shells and tridents, but the walrus heads are equally suitable and a relief from the omnipresent lion head of convention. Howard & Galloway meanwhile were doing the pressed brick and terra cotta Security, Adam Grant and Levi Strauss buildings. Later, by perhaps two years, Lewis Hobart began near this group his Newhall Building, of which more is to be said.

In the center of things Bliss & Faville were doing that straightforward solution of the office building, the Balboa.

It may be surprising to learn that in almost every instance these new buildings are higher and bigger than ever! We had all learned that the tall buildings having an elastic, articulated skeleton anchored to deep heavy foundations is the safest and most sane type with which to meet the earthquake hazard. But if these others were big undertakings, they were outdone in size by the Phelan Building designed by Wm. Curlett & Son; its walls are of cream colored glazed terra cotta above the cast-iron and glass of the two lower stories. This building fills the largest of the many "gore" lots — like New York's "Flatiron" — resulting from the acute intersections of Market street.

Taking these buildings as a general class — and the criticism may be applied equally to the stores and office buildings — the material is candidly burnt clay and unimpeachable, but there has been a too common failing to appreciate and apply the possibilities in form, of terra cotta as a plastic material. The plain classic pilaster, in its purest cut stone types, appears again and again; while broad surface-ornament forms, so inviting to the modeler and so suited to the mould, one regrets to find so seldom. In Mr. Lansburgh's building for Elkan Gunst the reverse is true; the forms are less stone-like but — there is a "but" — the material is so perfect an imitation of granite that the Northwestern Terra Cotta Company might almost be suspected of ownership in a quarry.

The Metropolitan Life Building! It has already been published, otherwise it should be given much space. Michel Le Brun knew the splendid site, for he had come out from New York just to "size things up" there on Nob Hill; and few buildings are so perfectly suited to their places. It is a stately mass on a commanding little hill, placed above a terrace wall and with a bit of grass about it; in gleaming light glazed terra cotta, with frieze of deep blue and golden brown, it is a fitting and impressive home for the Pacific Coast branch of a colossal insurance institution.

One turns with pleasure to take fuller notice of the Newhall Building, now nearing completion from Mr. Hobart's plans. This strikes us as being very nearly "it" as an architectural interpretation of the moderately tall, steel framed building. The two lower stories form a base of cut stone; the shaft is red brick of fine color and wall texture, with narrow piers and broad grouped windows, of which the spandrels and the outlined jambs are cream-colored matt glaze terra cotta. The reveals are ornamented and deep, to make the already dominant verticals the more insistent — and the composition has a crowning motive that is altogether satisfying.

This building carries some exceptionally well modeled ornament. Unfortunately some of the best pieces of it — the "bambini" panels — are placed so high in the composition that their charm does not count as might be wished. Perhaps one must go back to Cope & Stewardson's "Harrison Building" in Philadelphia if he would find a parallel to the Della-Robbia-like sentiment of this work. It is plain that more than a passing interest was here; that between architect and sculptor there existed a perfect *rapport*; that behind these two there has been responsive, intelligent co-operation on the part of a maker anxious to produce something of real distinction. Such was the case here, indeed. But the surprising fact is that in this concert of architect, sculptor and practical terra cotta maker, the sculptor is the same man who seventeen years ago modeled the lovely little figures of that earlier masterpiece — on the other side of the continent; and it was the same man, here representing a local terra cotta manufacturer, whose painstaking care then furthered the work of that sculptor and John Stewardson at the Perth-Amboy works.

One cannot think of these men without acknowledgment of their contribution to the community: the introduction of successful coast-made polychrome terra cotta, on an adequate commercial basis. Their valuable experience in a special field shortened the experimental period and put at the hand of the architectural designer a material peculiarly adapted to local conditions.

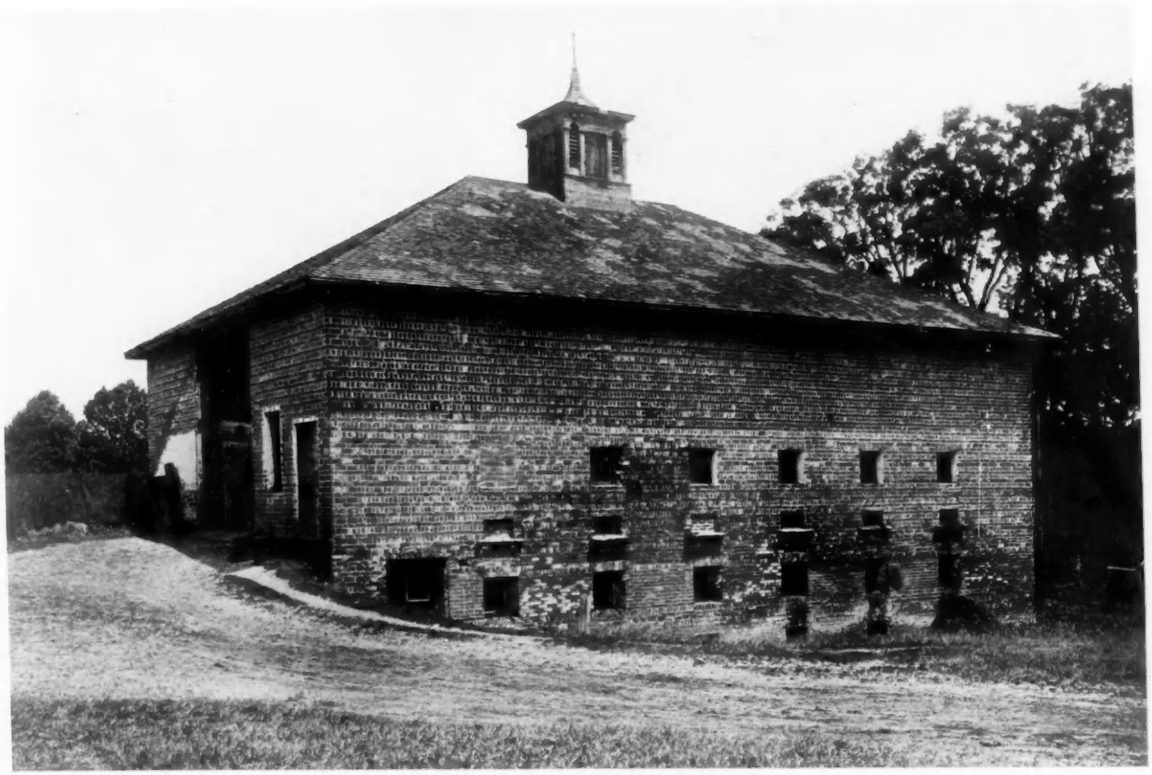
To California the love of color is a natural heritage, bequeathed by Spanish and Mexican, Japanese, Chinese and Hawaiian influences. The Iberian tradition up the coast in California is of gleaming white and glaring primaries. From the Orient and the Islands came over seas such tints and tone gradings as white man never comprehended before Whistler. The land itself, too, is colorful, while the sunshine, cool shadow and clear skies, seem to cry for color everywhere. The use of color, then, is destined to become more pronounced and general. Already a beginning has been made, and doubtless succeeding essays in this field will be increasingly successful.

Editorial Comment and Miscellany.

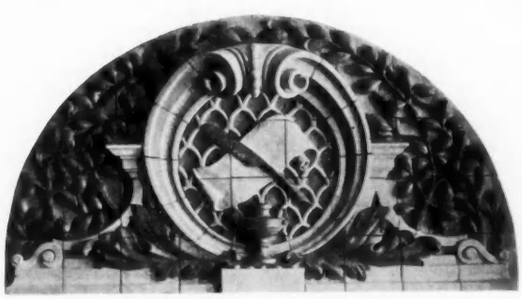
PLATE ILLUSTRATIONS—DESCRIPTION.

House at Dedham, Mass. Plates 132, 133, 134, 135. The exterior of this house is treated in brick with marble trimmings. The building has a commanding view of the lake on one side with a formal sunken garden on the other. Upon the interior the entrance hall and main stairway are finished in Caen stone. The balustrade is of ornamental bronze. The living room is treated in Circassian walnut, the library in old fumed oak, and the dining room in San Domingo mahogany. The service end of the house is made sanitary with walls of hard cement highly polished and the corners rounded. The third floor provides for guest rooms and servant quarters. The entire house is fireproof with walls of brick, partitions of terra cotta, and floors of terra cotta and tiling. The roof is of moss green dull glaze tile in shingle effect. Cost of the building was approximately twenty per cent more than a similar house would cost if built of wood.

Lincoln Park Refectory, Chicago. Plates 136, 137, 138. This building is designed primarily as a park restaurant and boathouse. The exterior is of a variegated deep rose colored brick with wire cut face, laid with deep sunk horizontal joints. The outside trimmings are of terra cotta and stone, while the roof is of green glazed tile. Upon the interior all walls are of a mottled buff shade of pressed brick. The main dining hall which is used as an assembly hall in the winter is treated with decorative panels of faience and trimmings of matt glazed green terra cotta.



A VERY OLD BRICK BARN AT NAYATT, R. I.



LUNETTE.
Executed in architectural faience by the Rookwood Pottery Company.
Brinton B. Davis, Architect.

TOWER OF PISA.

THE Royal Commission which was appointed some months ago to examine the foundation and the stability of the Tower of Pisa has handed in its report to the government, but only part of it has been made public. The commissioners found that instead of there being a massive and spacious base there is only a ring of masonry exactly corresponding in girth to the tower

itself. Another astounding fact is that the foundations are merely three meters beneath the surface. The commission claims that the above facts constitute an incontrovertible proof that the tower was originally built perpendicularly, and that its leaning propensities which are becoming more and more accentuated are due to other causes than the intention of its constructors. They discovered that the base of the tower has always been immersed in water, and that a deep cistern to drain off the water, dug in 1840, has made matters worse owing to the general character of the subsoil which extends to the bed of the Arno, but more especially to seismic movements. The commissioners suggest that the government give immediate attention to the condition of the tower with a view to prevent its further leaning, and also to repair the interior. Signori Cuppari, a well-known engineer, says: "The first thing to do is to prevent the possibility of all oscillation, brace the tower up from the southern side, support the southern wall by a temporary foundation, and then repair the foundation by driving piles on which a new and substantial foundation can be built." It is now seven weeks since the report of the commission has been submitted and so far the government has taken no action. This apparent dilatoriness of the government is causing considerable perturbation throughout Italy as well as other countries.

APARTMENT HOUSE, PARK AVE., NEW YORK.
Built of buff Devonshire brick made by the Kittanning Brick & Fire Clay Company.
Pfotenhauer-Nesbit Company, New York Representatives.
Headman & Schoen, Architects.

DETAIL BY ATLANTIC TERRA COTTA COMPANY.
Howells & Stokes, Architects.

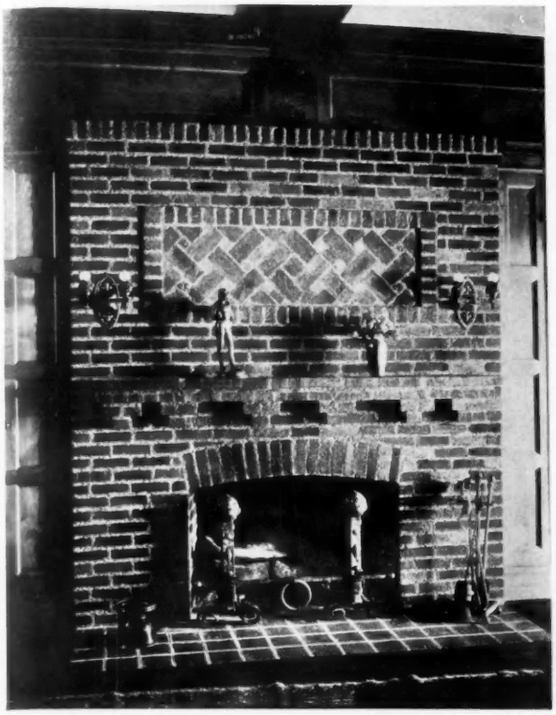
DETAIL BY SOUTH AMBOY TERRA COTTA COMPANY.
Pollard & Steinam, Architects.

TERRA COTTA MANUFACTURER KNIGHTED.

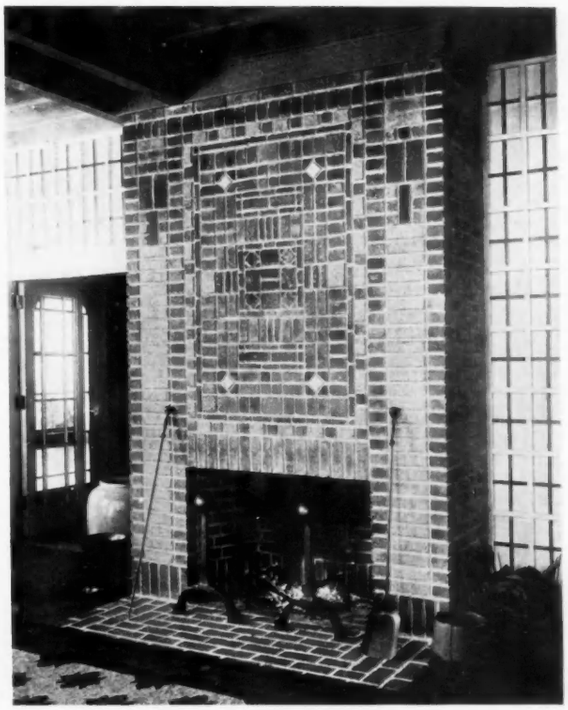
MR. KARL MATHIASEN, President of the New Jersey Terra Cotta Company, New York, has been created a Knight of "Danebrog" by the King of Denmark.

Mr. Mathiasen was born in Denmark fifty years ago, but has been a resident of this country for about thirty-six years. He is a director in the Danish-American Association, a society whose object is to further a closer relationship between the Danes in the United States and between the United States and Denmark. The aim of the society is purely cultural and it is for the interest which Mr. Mathiasen has taken in this Danish-American movement, and the assistance extended by him to his

DETAIL BY AMERICAN TERRA COTTA & CERAMIC COMPANY.
Purcell, Feick & Elmslie, Architects.



FIREPLACE IN A LIVING ROOM.
H. E. Davidson, Architect.



FIREPLACE IN A SUN PARLOR.
Andrews, Jaques & Rantoul, Architects.

country-fellows, that his services have been recognized by the King of his native land.

IN GENERAL.

At the annual meeting of the Washington Architectural Club, October 4th, the following officers were elected for the year 1910–1911: President, C. L. Harding; vice-president, D. J. Lix; secretary, A. L. Blakeslee; treasurer, S. M. Hitt; governor, W. W. Youngs; auditors, W. B. Olmsted and G. F. Dietel.

We commend the course of action taken by the newly selected committee of architects, Messrs. Carrère, Kendall, and Brunner, who were appointed to conserve and increase the architectural harmony and beauty of Fifth Avenue, New York City. They propose to influence property owners, not by means of ordinances and other compulsory measures, but by suggestion and argument. The committee is well organized and each member is determined to relieve the chaotic and unimpressive effect of the architecture in general, and make the various

DOUGLAS PARK REFECTORY, CHICAGO, ILL.
Roofed with Ludowici-Celadon tile.
W. C. Zimmerman, Architect.

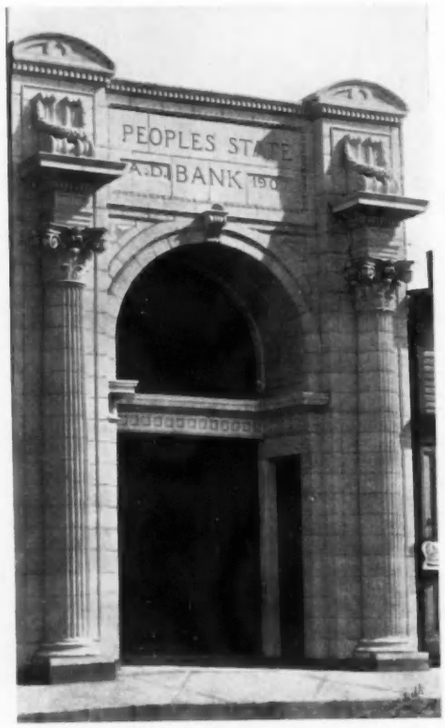
DETAIL BY CONKLING-ARMSTRONG TERRA COTTA COMPANY.
Pell & Corbett, Architects.

thoroughfares beautiful through a harmonious design preserved throughout.

Plans have been submitted to the superintendent of buildings at Seattle for the erection of the largest and costliest office building on the Pacific coast. The plans call for a fireproof building, forty-two stories high, and are the work of Gaggin & Gaggin, architects.

Work will soon begin on the large office building for the Underwriters at Chicago. The architects, D. H. Burnham & Co., say that the building will be completed within a year. The cost of the building together with the site will approximate $6,300,000.

Seattle is about to construct an art museum that promises to be the finest building of this nature on the Pacific coast. The building is planned with the purpose of exhibiting large collections of art loaned by the various countries. In addition to the galleries there will be a large auditorium. The whole structure is to be erected at a cost of $500,000.



PEOPLES STATE BANK, CROWN POINT, IND.
Built of full glaze cream terra cotta made by the Northwestern Terra Cotta Company.
Beers & Beers, Architects.

DETAIL BY NEW JERSEY TERRA COTTA COMPANY.
Warren & Wetmore, Architects.

DETAIL BY NEW YORK ARCHITECTURAL TERRA COTTA COMPANY.
E. F. Guilbert, Architect.

The Cleveland Chapter of the American Institute of Architects and the Cleveland Architectural Club will hold their annual exhibition during the latter part of November.

The annual meeting of the Philadelphia Chapter, A. I. A., has just been held and resulted in the re-election of most of the officers of the past year — those elected being: Wm. D. Hewitt, president; John Hall Rankin, first vice-president; Horace Wells Sellers, secretary; John P. B. Sinkler, librarian; Charles L. Borie, Jr., treasurer. Executive Committee: D. Knickerbacker Boyd, Arnold H. Moses, Paul P. Cret.

DETAIL BY KETCHAM TERRA COTTA WORKS.
Ben R. Stevens, Architect.

Oswald C. Hering has formed a partnership with Douglass Fitch, and will continue the practice of architecture under the firm name of Oswald C. Hering and Douglass Fitch. Offices, 1 West 34th street, New York.

Gascoigne & Shattuck were the builders of the house at Dedham, Mass., James Purdon, architect, which is illustrated in this month's issue.

The Atlantic Terra Cotta Company will furnish gray terra cotta for the new Rector's Hotel, 44th street and Broadway, New York City, D. H. Burnham & Co., architects; white matt glazed terra cotta for the new theater, 43d street and Broadway, New York City, George Keister, architect; white terra cotta and blue and white Della Robbia Bambino panels for the new Day Nursery at Fall River, Mass., Matthew Sullivan, architect; white glazed terra cotta for the Locomotive Engineers' Building at Cleveland, Ohio, Knox & Elliott, architects.

The firm of Gredig & Lynn, architects, Knoxville, Tenn., has been dissolved. Albert E. Gredig succeeds to the business with offices in the Bank and Trust Building.

FIREPROOF HOUSES OF NATCO HOLLOW TILES AND HOW TO BUILD THEM is the title of a book just put out by the National Fireproofing Co., Pittsburg. To anyone interested in this type of construction this book will be invaluable, for most if not all of what one will want to know is here told.

CAPITAL EXECUTED IN TERRA COTTA BY THE ATLANTIC TERRA COTTA COMPANY.
McKim, Mead & White, Architects.

DETAIL BY E. WILSON, ARCHITECT.
Atlantic Terra Cotta Company, Makers.

Recent excavations at Abbey Wood, England, on the site of Lesnes Abbey have revealed the ruins of a structure more than 250 feet long and 50 feet across the transepts. In the center of the cross stood a square tower and part of the supporting columns still remain. Plans of the excavations show the ruins of Lesnes Abbey to consist of an Abbey church, lady chapel, small chapels, a chapter house, cloisters, and indications of other buildings.

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A HOUSE OF BRICK OF MODERATE COST—THE TITLE OF A 96 PAGE BOOKLET WHICH CONTAINS 71 DESIGNS FOR A BRICK HOUSE OF MODERATE COST. THESE DESIGNS WERE SUBMITTED BY WELL-KNOWN ARCHITECTURAL DRAFTSMEN IN COMPETITION. INTERESTING ARTICLES. ILLUSTRATIONS OF HISTORICAL BRICK HOUSES. PRICE, FIFTY CENTS. ROGERS & MANSON, BOSTON.

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BULLETIN

RECENT WORK, illustrated in this issue of THE BRICKBUILDER

House at Dedham, Mass. . . . Plates 132, 133, 134, 135
JAMES PURDON, Architect

Fireplace . . . . . Page 239
ANDREWS, JAQUES & RANTOUL, Architects

Fireplace . . . . . Page 239
H. E. DAVIDSON, Architect

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The Franklin Union Building in Boston, R. Clipston Sturgis, Architect, is a sample of our work, and we have contracts for the North Dakota, the largest Battleship in the United States Navy; the extensions of the Suffolk County Court House in Boston, George A. Clough, Architect; and the Registry of Deeds, Salem, Mass., C. H. Blackall, Architect.

We solicit inquiries and correspondence.

JOHN H. PRAY & SONS COMPANY
646-658 WASHINGTON STREET, Opp. Boylston Street
BOSTON : : : : : : : : : MASS.

COMPETITION FOR A HOTEL IN AN AMERICAN CITY OF MODERATE SIZE.

FIRST PRIZE, $500. SECOND PRIZE, $250. THIRD PRIZE, $150.
FOURTH PRIZE, $1.00. HONORABLE MENTIONS.

COMPETITION CLOSES AT 5 P.M., MONDAY, JANUARY 16, 1911.

PROGRAM.

THE problem is a HOTEL OF MEDIUM SIZE, planned to meet the ordinary demands of a small American city. The site is assumed to be at the corner of two intersecting streets; the lot ample in size to accommodate the building and practically level.

The size and shape of the building are left entirely to the designer, except that not less than one hundred and not more than one hundred and twenty-five sleeping rooms are to be provided above the second floor. At least one-half of the sleeping rooms are to have bathrooms and the others may be provided with toilet and shower accommodations.

The ground or first floor plan is to provide the usual accommodations which are necessary in a hotel of this size.

The second floor plan may be given over in whole or in part for family suites, reception rooms, small meeting rooms, etc., etc.

The upper floor plan should provide for a large social hall to be used for banquets, dances, and similar functions. In connection with this social hall, and on the same floor, there should be provided suitable reception rooms, coat rooms, smoke room, service rooms, toilet rooms, etc., etc.

A roof garden may or may not be incorporated in the design.

It is assumed that the basement plan provides the necessary space for mechanical equipment, storage rooms, kitchen, lavatories, barber shop, and perhaps a rathskeller, but the plan of this floor is not required.

The exterior of the building is to be designed entirely in architectural terra cotta, and it is suggested that at least portions of the walls be treated in color.

The chief object of this competition is to encourage the study of the use of architectural terra cotta. There is no limit set on the cost of the building, but the design must be suitable for the character of the building and for the material in which it is to be executed.

The following points will be considered in judging the designs:

A. The general excellence of the design and its adaptability to the prescribed material.
B. The intelligence shown in the constructive use of architectural terra cotta.
C. Excellence of plan.

DRAWINGS REQUIRED.

On one sheet, the principal elevation drawn at a scale of 8 feet to the inch. On the same sheet, the first and second floor plans, a typical bedroom plan, and the upper floor plan, drawn at a scale of 16 feet to the inch; also a small sketch plan of the roof garden if that feature is provided for. On this same sheet, if space permits, give sketch of an interesting interior.

On a second sheet, the elevation of secondary importance drawn at a scale of 16 feet to the inch, and a sufficient number of exterior details drawn at a scale of ½ inch to the foot to fill the sheet.

The details should indicate in a general way the jointing of the terra cotta and the sizes of the blocks. The color scheme is to be indicated either by a key or a series of notes printed on one of the sheets.

The size of each sheet (there are to be but two) shall be exactly 36 inches by 24 inches. Strong border lines are to be drawn on both sheets, 1 inch from edges, giving a space inside the border lines 34 inches by 22 inches. The sheets are to be of white paper and unmounted.

All drawings are to be in black ink, without wash or color, except that the walls on the plans and in the sections may be blacked-in or cross-hatched.

Graphic scales to be on all drawings.

Each set of drawings is to be signed by a *nom de plume*, or device, and accompanying same is to be a sealed envelope with the *nom de plume* on the exterior and containing the true name and address of the contestant.

The drawings are to be delivered flat, or rolled (packaged so as to prevent creasing or crushing) at the office of THE BRICKBUILDER, 85 Water Street, Boston, Mass., charges prepaid, on or before January 16, 1911.

Drawings submitted in this competition must be at owner's risk from the time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. Those who wish their drawings returned may have them by enclosing in the sealed envelopes containing their names, ten cents in stamps.

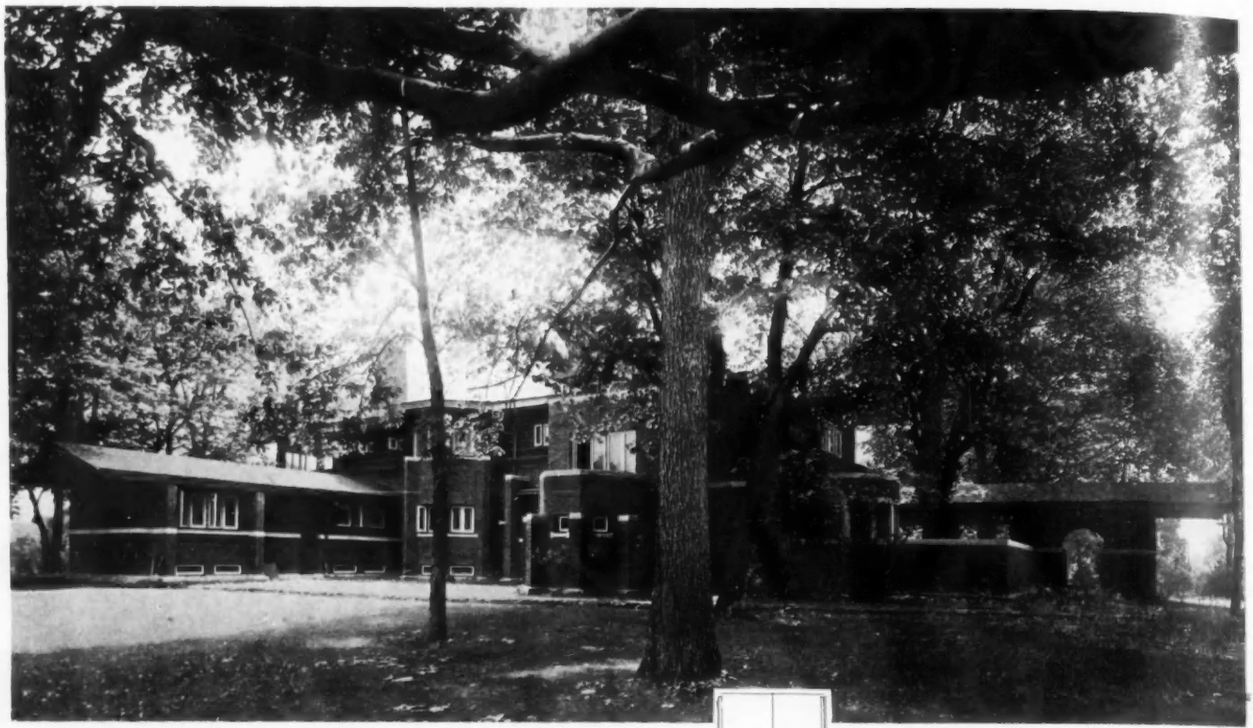
The designs will be judged by three or five well-known members of the architectural profession.

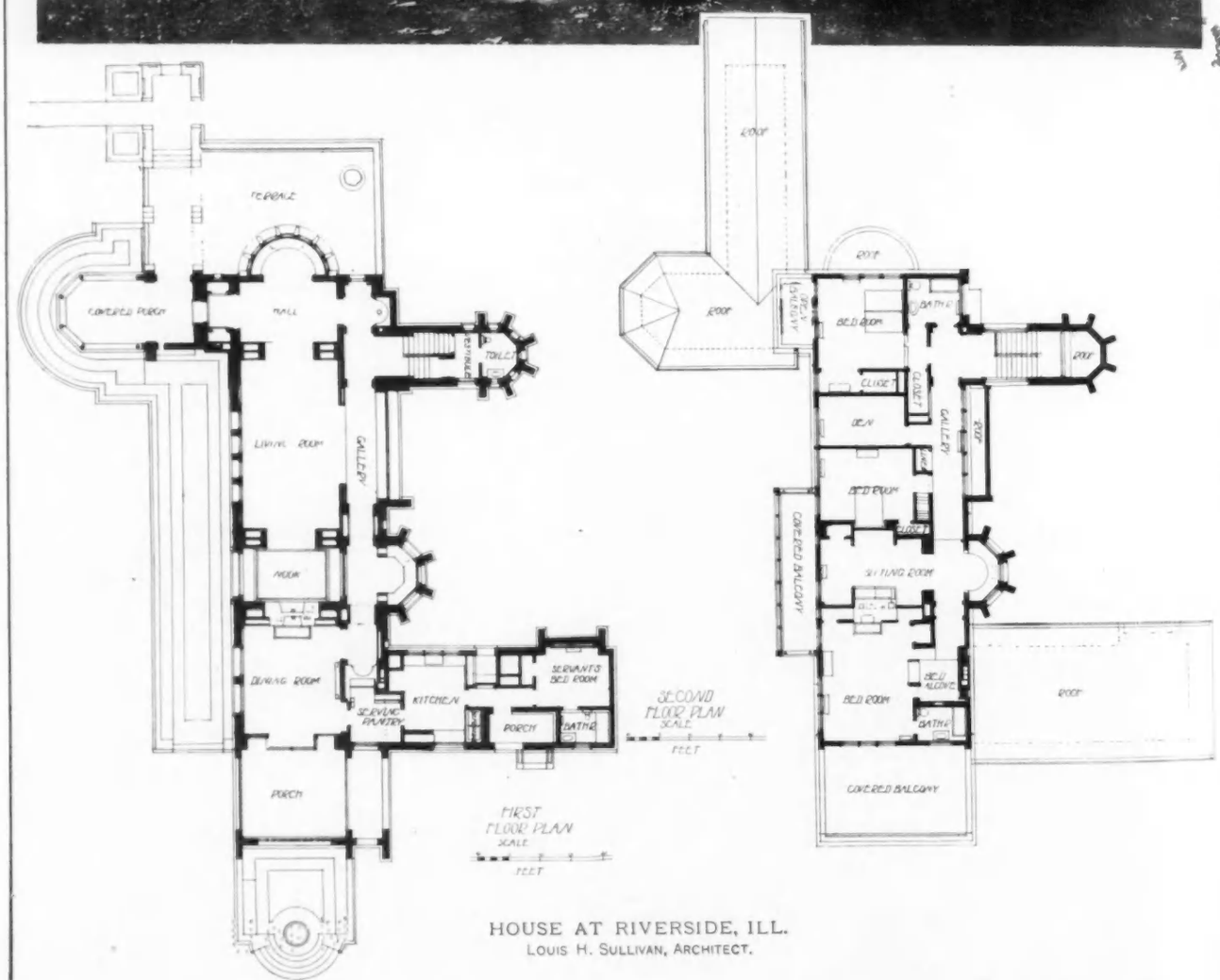
For the design placed first in this competition there will be given a prize of $500.
For the design placed second a prize of $250.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

The manufacturers of architectural terra cotta are patrons of this competition.

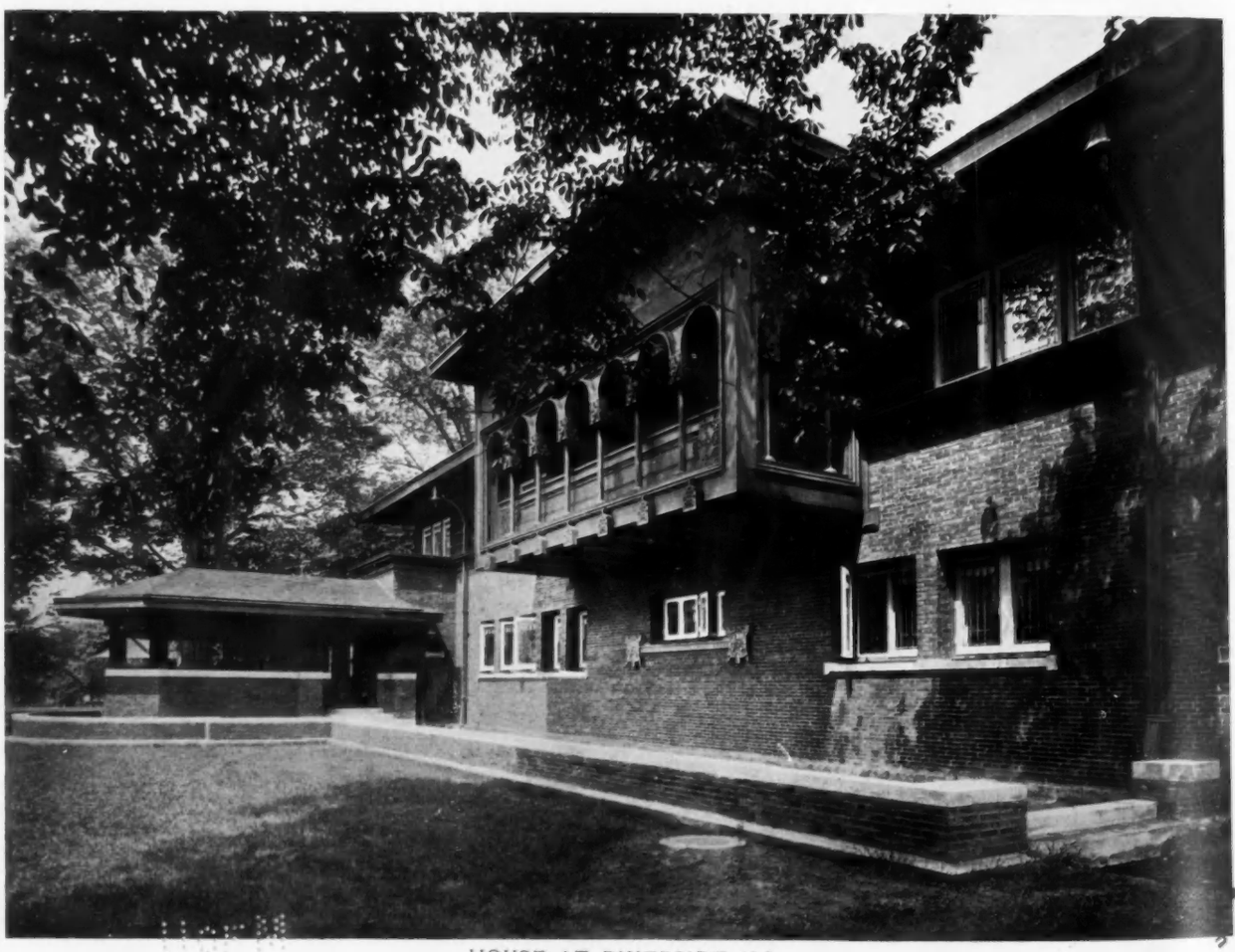
The competition is open to everyone.

HOUSE AT RIVERSIDE, ILL.
LOUIS H. SULLIVAN, ARCHITECT.





HOUSE AT RIVERSIDE, ILL.
LOUIS H. SULLIVAN, ARCHITECT.



HOUSE AT RIVERSIDE, ILL.
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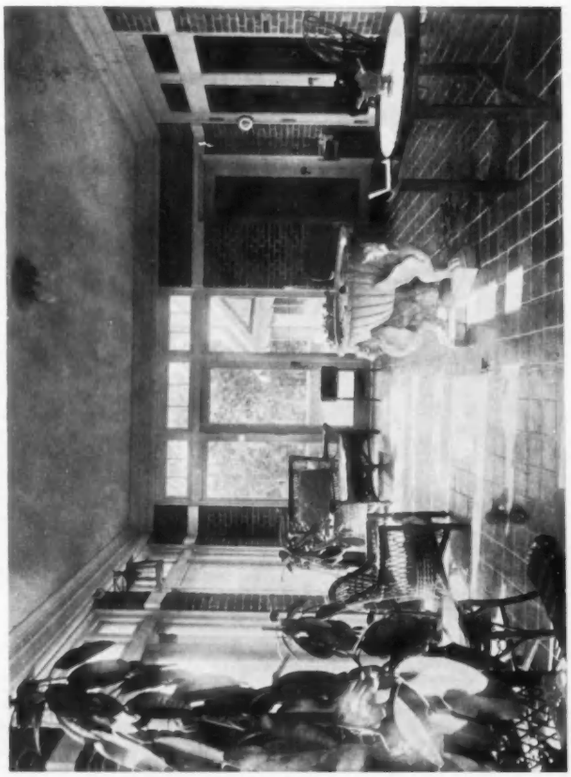
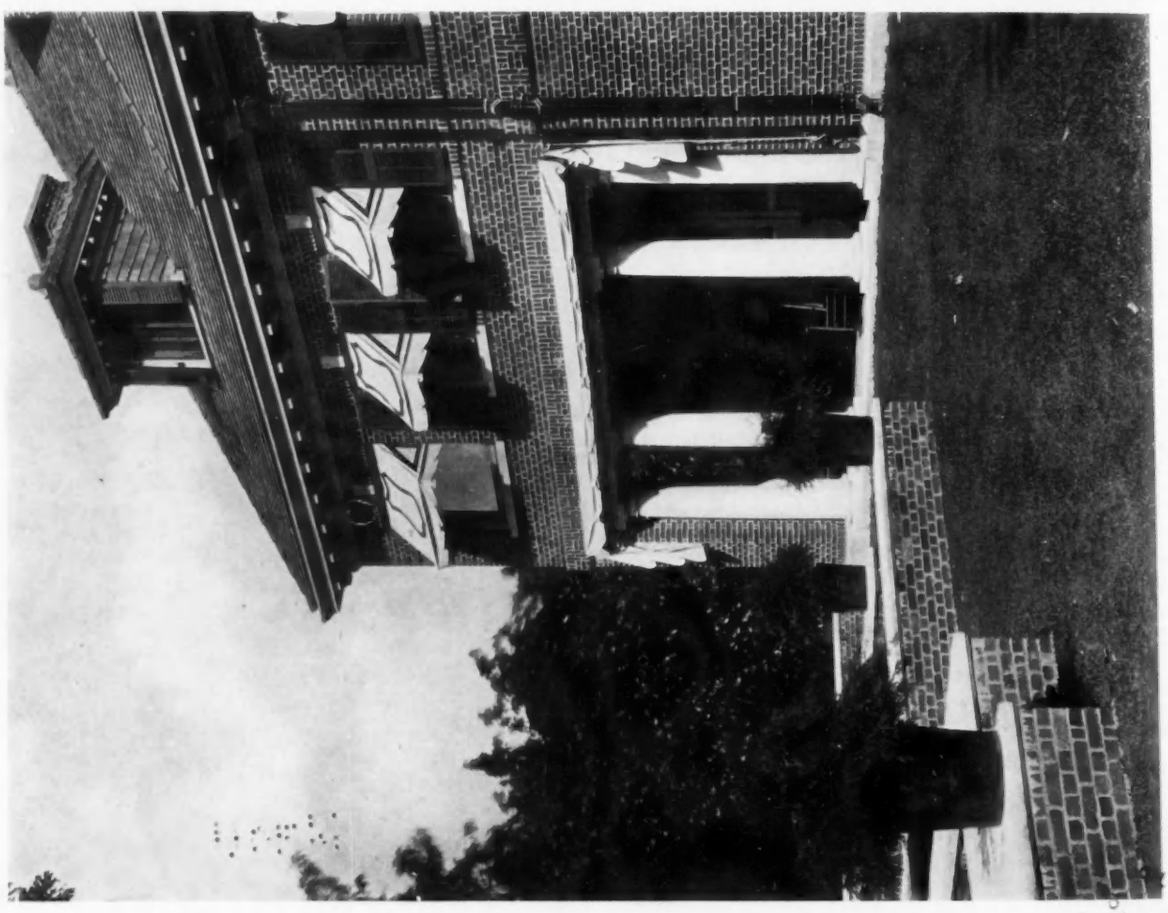


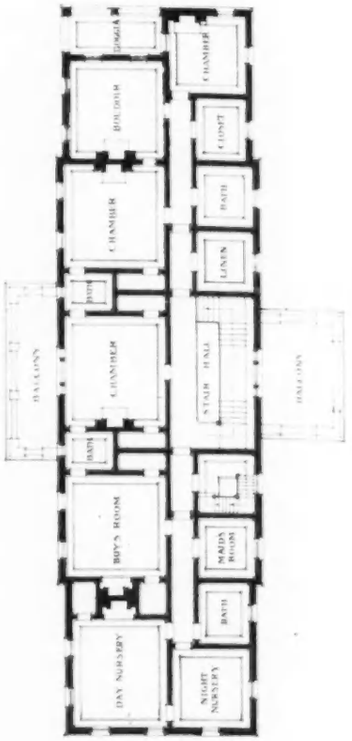


DETAILS, HOUSE AT DEDHAM, MASS.
JAMES PURDON, ARCHITECT.

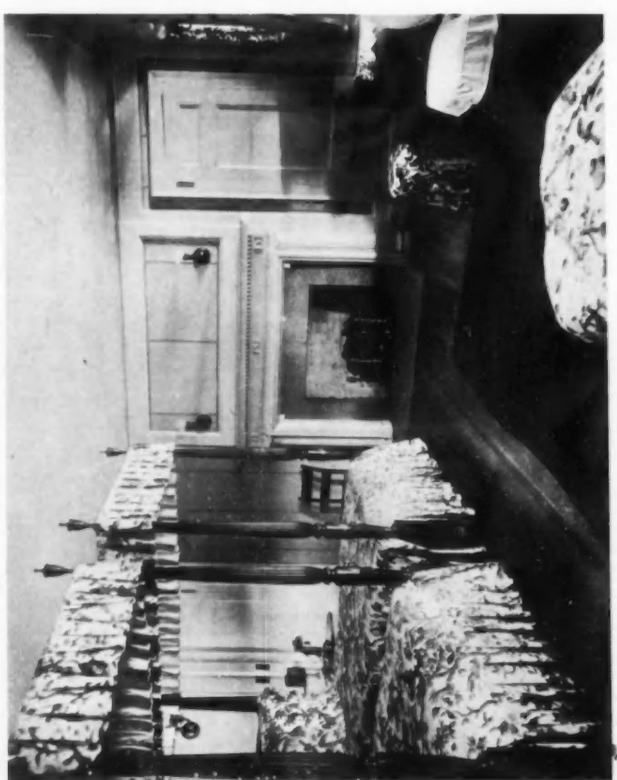
INTERIOR VIEWS AND PLANS.

HOUSE AT DEDHAM, MASS.

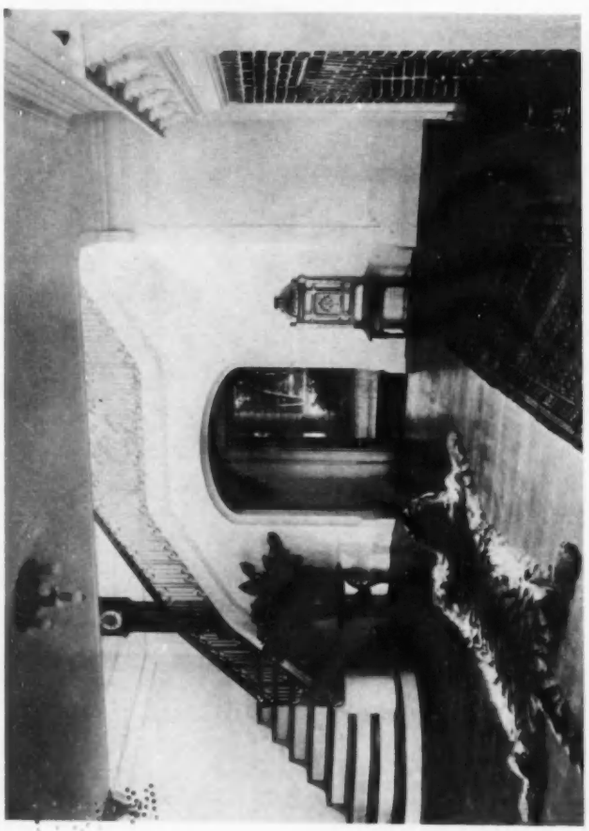
JAMES PURDON, ARCHITECT.



SECOND FLOOR PLAN.

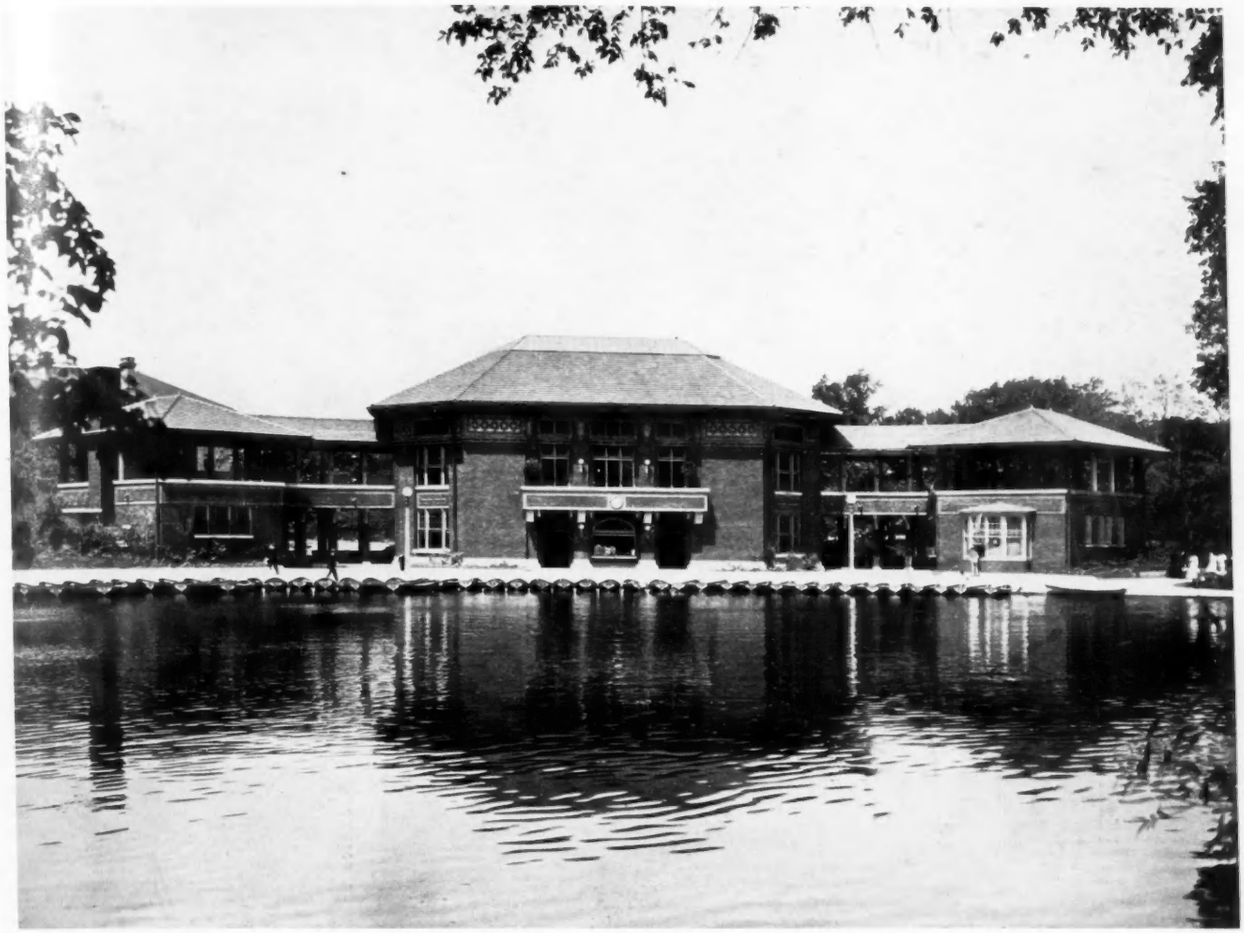


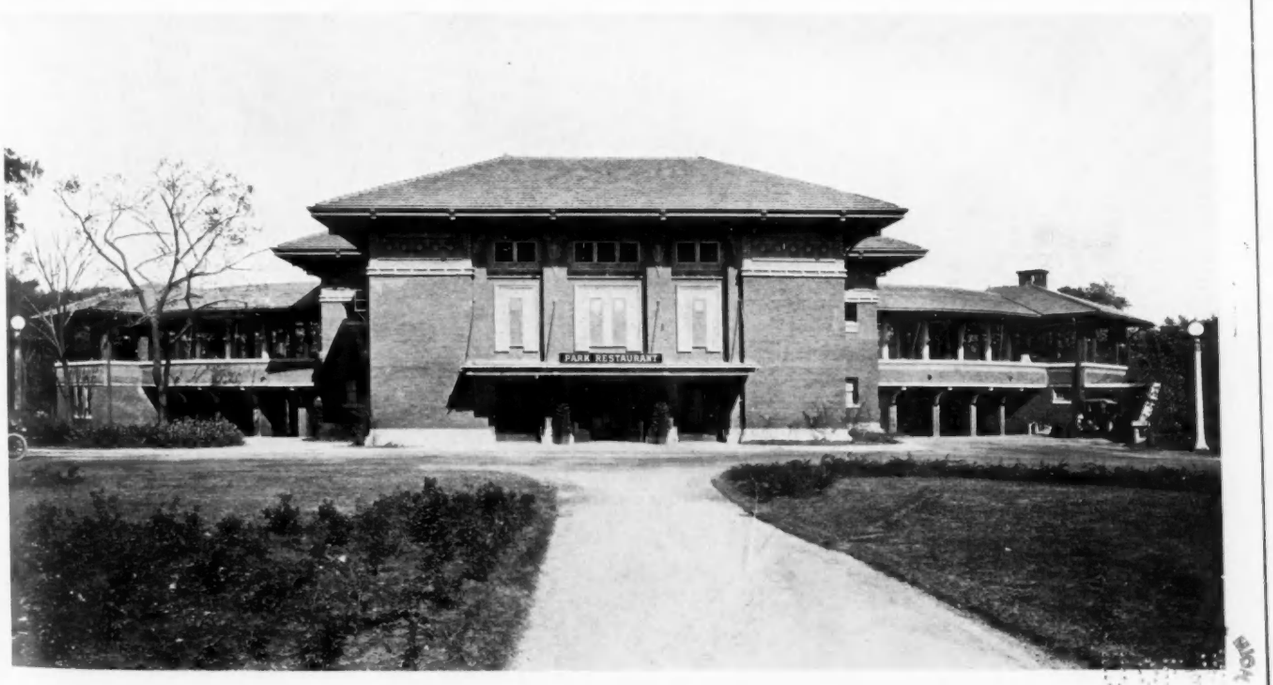
FIRST FLOOR PLAN.



INTERIOR VIEWS, HOUSE AT DEDHAM, MASS.
JAMES PURDON, ARCHITECT.

HOUSE AT DEDHAM, MASS.
JAMES PURDON, ARCHITECT.





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PERKINS & HAMILTON, ARCHITECTS.

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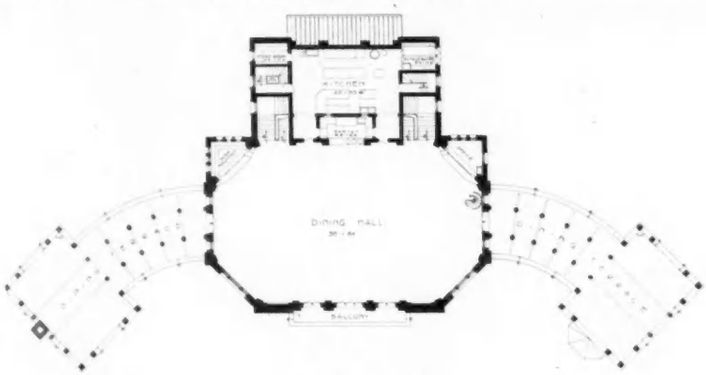


MAIN FLOOR PLAN

LINCOLN PARK

REFECTORY.

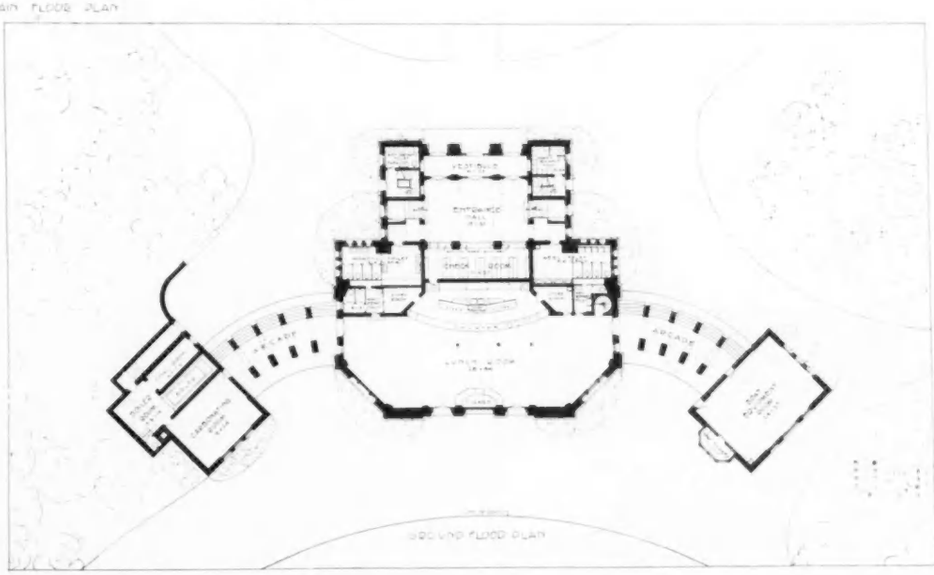
CHICAGO, ILL.

PERKINS

&

HAMILTON,

ARCHITECTS.



GROUND FLOOR PLAN

HOUSE AT CHICAGO, ILL.
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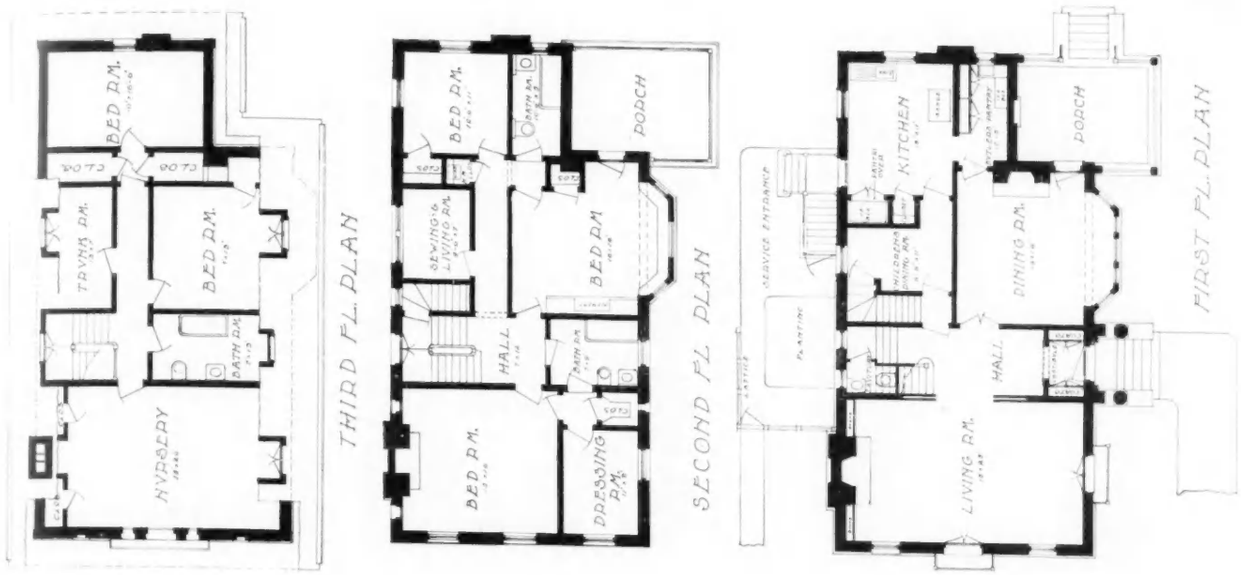
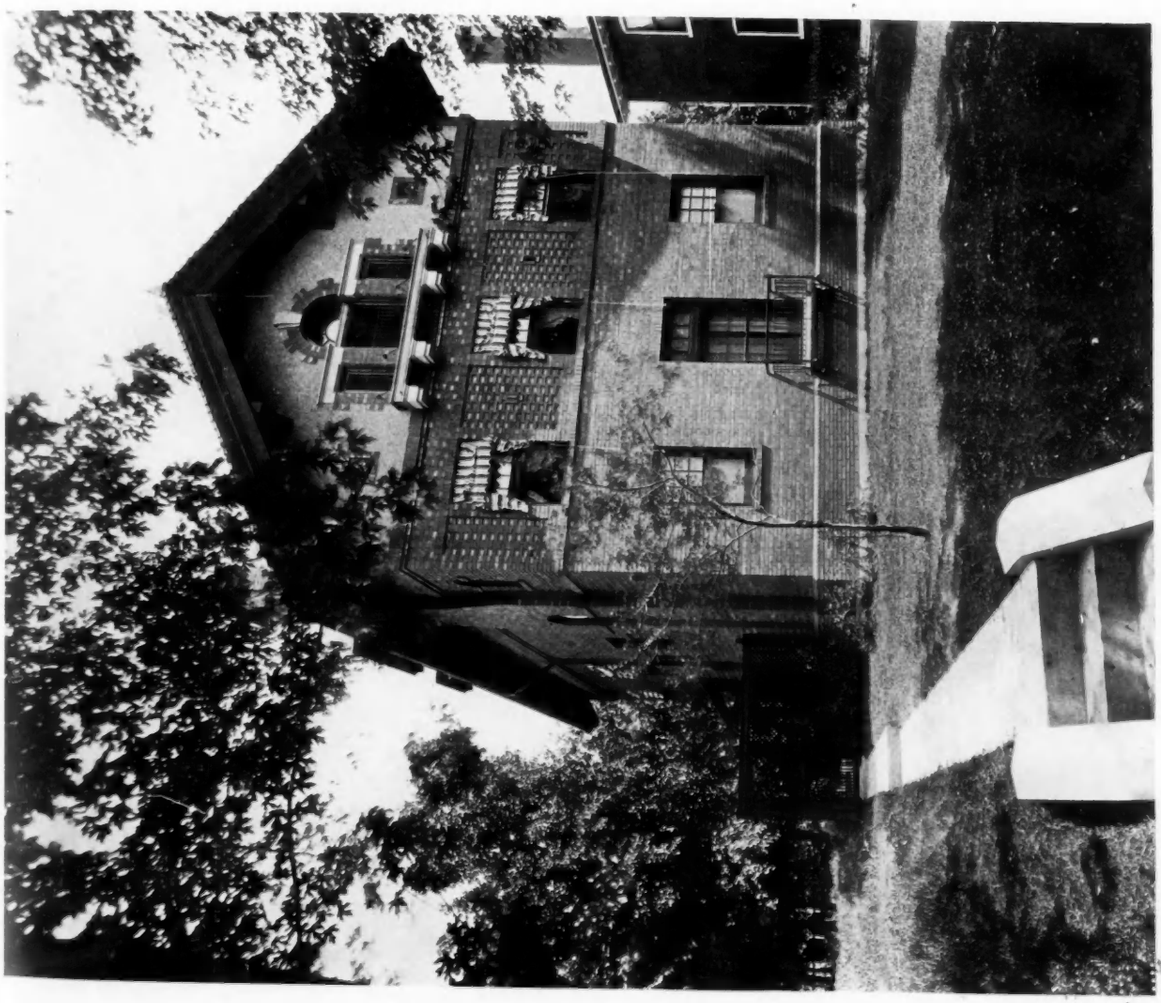
HOUSE AT ST. LOUIS, MO.
EDWARD G. GARDEN, ARCHITECT.





HOUSE AT ST. LOUIS, MO.
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